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Power Production and Regulatory Reform: Easing the Transition to an Economic Energy Future

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POWER PRODUCTION AND REGULATORY REFORM: EASING THE TRANSITION TO AN ECONOMIC ENERGY FUTURE

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INTRODUCTION

Power production and the regulation of the electric utility industry are presently at a crossroads. With new capacity costs rising far faster than revenues, many utilities have been forced to defer or cancel the construction of new generating stations.[1] This curtailment of planned expansion has raised the spectre of future capacity shortages and elicited proposals from many policymakers of major regulatory initiatives designed to stimulate renewed construction.[2] Others, more dubious about the wisdom of the industry's continued commitment to large coal or nuclear units, have contended instead that adequate energy supplies can be better assured by policies designed to encourage both conservation and the development of alternative energy sources.[3] Regardless of one's view, it is clear that society pays a high price for the construction of either too much or too little generating capacity. Once the source of economies of scale which paved the way to cheap electric-

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1. *See* GENERAL ACCOUNTING OFFICE, ELECTRIC POWERPLANT CANCELLATIONS AND DELAYS: 1980 REP. TO THE CONGRESS. One hundred eighty-four facilities, representing 26% of 1979 generating capacity, were cancelled outright between 1974 and 1978. *Id.* at 6.

2. A report recently prepared by the Congressional Budget Office for the Senate Committee on Energy and Natural Resources examines a range of "policy options" for stimulating new generating capacity, including increased federal tax subsidies, federal preemption of ratemaking policies, regional control of capacity planning, and total deregulation of bulk power supply. *See Financial Health, Regulation of Utilities Must Improve for Sake of Future Power Costs*, 10 ENERGY USERS REP. (BNA) 1184 (Dec. 2, 1982). Similar proposals are also under consideration by an executive agency task force known as the Electricity Policy Project. *See One-Time Rate Hike of 12.5 Percent Recommended To Bolster Sagging Economy*, 10 ENERGY USERS REP. (BNA) 1079 (Oct. 28, 1982). *See also Task Force Recommends Reform Package to Streamline Licensing, Boost Industry*, 10 ENERGY USERS REP. (BNA) 1164 (Nov. 25, 1982). There, a proposal by the Nuclear Regulatory Commission (NRC) to "streamline" the nuclear power plant licensing process in order to encourage new nuclear construction is discussed.

3. *See, e.g.*, ENERGY FUTURE: REPORT OF THE ENERGY PROJECT AT THE HARVARD BUSINESS SCHOOL (Stobaugh & Yergin ed. 1979) [hereinafter cited as ENERGY FUTURE].

ity, new baseload generating units now cost more than one billion dollars, many times that of older plants. Overbuilding thus may impose a heavy financial burden on consumers. In addition, the operation of coal and nuclear units each present significant, little-understood risks to public health, safety and the quality of the environment. Underbuilding, on the other hand, invites power shortages—extraordinarily disruptive events whether they are called "blackouts," "brownouts" or "outages"—or the use of far more expensive generating equipment, such as gas turbines, to meet baseload energy requirements.

Society thus has a vital interest in minimizing the risk of error in baseload capacity expansion. This Article suggests that this interest is not being protected by existing institutional arrangements. Section I examines the history of and need for governmental regulation of capacity expansion. After reviewing the origins and modern-day ramifications of the electric utility industry's commitment to centralized growth, the conclusion is reached that traditional cost-of-service regulation cannot operate to counteract the economic incentives for overexpansion which still exist. Section II then examines the current regulatory approach, which has evolved into a form of licensing, with government approval of utility proposed expansion hinging upon an evaluation of long-range forecasts of both the demand for electricity and the relative economics of alternative modes of generation. It is concluded that this approach has been a failure as well, not only because the fifteen to twenty year forecasts upon which it depends cannot be made within a tolerable margin of error, but also because it equates the "need" for new generating stations with the "demand" for electricity. This equation tends to obscure decentralized alternatives to continued capacity expansion. In Section III, a closer analysis of existing regulatory institutions leads to two recommendations: First, regulation should be restructured; the authority to make "need for power" determinations should be centered in state public utility commissions, to be exercised in the context of developing state-wide plans for energy supply. Second, the electric utilities should be given the opportunity and the incentive to develop energy sources other than central station generation. Such an approach, which promotes "good" investment decisions by the industry, seems vastly preferable to one which relies upon the prevention of "bad" choices by the government.

I. THE CASE FOR REGULATION

A. *The History of Public Regulation of Capacity Expansion*

Seventy-eight percent of the nation's electricity is produced by private, investor-owned utilities.[4] Beginning as small companies conducting business in fiercely competitive environments,[5] utilities rapidly evolved into large, vertically integrated enterprises supplying electricity as publicly regulated monopolies.[6] At the turn of the century, thirty-six hundred separate systems produced about six billion kilowatt hours of electricity; today, 95% fewer firms produce three hundred times as much energy.[7] The impetus for this transformation was, of course, the presence of large economies of scale,[8] particularly in power generation. Larger generating units lead to lower unit prices; these, in turn, lead to greater demand, and then to further capacity expansion, a cumulative and self-reinforcing process which delivered progressively cheaper electricity to the entire nation.[9] Under these conditions, continuous growth became an "axiom"[10] of the electric power industry, and capacity expansion was considered a managerial prerogative.[11]

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4. *See* DEPARTMENT OF ENERGY STATISTICS OF PRIVATELY OWNED ELECTRIC UTILITIES IN THE UNITED STATES—1979, at 15 (Oct. 1980). The remaining generation is produced by the federal government (10.5%), state and local utilities (9%) and rural cooperatives (2.5%). *Id.*

5. *See generally* Novick, *The Electric Power Industry*, 17 ENV'T 8 (1975); F. MCDONALD, INSULL (1962) (describing the career of Samuel Insull, one of the early magnates in the electrical power industry).

6. *See* 1 DEPARTMENT OF ENERGY, THE NATIONAL POWER GRID STUDY 19-22 (1980); ASSOCIATION OF THE BAR OF THE CITY OF NEW YORK, ELECTRICITY AND THE ENVIRONMENT: THE REFORM OF LEGAL INSTITUTIONS 23-24 (1972) [hereinafter cited as ELECTRICITY AND THE ENVIRONMENT]; FEDERAL POWER COMM'N, THE NATIONAL POWER SURVEY, pt. I, ch. II (1970); Meeks, *Concentration in the Electric Power Industry: The Impact of Antitrust Policy*, 72 COLUM. L. REV. 64, 67-69 (1972).

7. *See* S. BREYER & P. MACAVOY, ENERGY REGULATION BY THE FEDERAL POWER COMMISSION 90 (1974); DEPARTMENT OF ENERGY STATISTICS OF PRIVATELY OWNED ELECTRIC UTILITIES IN THE UNITED STATES—1979, *supra* note 4, at 12.

8. *See* THE NATIONAL POWER GRID STUDY, *supra* note 6, at 19; Gilmer & Meunier, *Electric Utilities and Solar Energy: The Service Contract in a New Social Context*, 30 MERCER L. REV. 377, 378 (1979); *Economies Of Scale In The Electric Power Industry*, in VALUES IN THE ELECTRIC POWER INDUSTRY (K. Sayre ed. 1977); Hughes, *Scale Frontiers In Electric Power*, in TECHNOLOGICAL CHANGE IN REGULATED INDUSTRIES (W. Capron ed. 1971).

9. MANCKE, SQUEAKING BY: U.S. ENERGY POLICY SINCE THE EMBARGO 133-36 (1976) [hereinafter cited as SQUEAKING BY]; Joskow, *Inflation and Environmental Concern: Structural Change in the Process of Public Utility Regulation*, 17 J.L. & ECON. 291 (1974); 2 A. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, 12 (1971).

10. Novick, *supra* note 5, at 7.

11. *See generally* Joskow, *supra* note 9, at 291; E. BERLIN, C. CICCHETTI & W. GILLEN,

In the late 1960s the economics of power production changed rather dramatically.[12] Further economies of scale seemed to vanish,[13] and inflation combined with soaring interest rates to assure that the marginal cost of new generating capacity would far exceed the average cost of existing plants.[14] Under these conditions, the expansion of generating capacity now could be expected to lead to higher average production costs, which would lead to higher rates; these, in turn, would lead to reduced demand, and then to further rate increases in order to realize revenues required to cover fixed costs. This, too, was a self-reinforcing process, but this time one which delivered progressively more expensive electricity to the nation.

Other implications of new capacity were also of mounting concern. Nuclear power plants posed a risk to public health and safety,[15] fossil-fired generating units fouled the air,[16] and hydroelectric facilities consumed scarce recreational and aesthetic resources.[17] At a time when landmark legislation had just proclaimed the nation's commitment to the protection of environmental values,[18] there appeared to be no greater threat to these values than the expansion plans of the electric utilities.[19] Indeed, by calling for

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PERSPECTIVE ON POWER: A STUDY OF THE REGULATION AND PRICING OF ELECTRIC POWER 53 (1975).

12. Joskow, *supra* note 9, at 312-13; SQUEAKING BY, *supra* note 9, at 133-34; ENERGY POLICY PROJECT, A TIME TO CHOOSE, at 256-57 (1974).

13. *See* Loose & Flaim, *Economies of Scale and Reliability: The Economics of Large Versus Small Generating Units*, 4 ENERGY SYS. & POL'Y J. 37 (1980); Jones, *Example of a Regulatory Alternative to Antitrust: New York Utilities in the Early Seventies*, 73 COLUM. L. REV. 462, 501 (1973).

14. SQUEAKING BY, *supra* note 9, at 135; BERLIN, CICCHETTI & GILLEN, *supra* note 11, at 1-11.

15. ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 33-38. For a bibliography of the then-contemporary literature, see S. EBBIN & R. KASPER, CITIZEN GROUPS AND THE NUCLEAR POWER CONTROVERSY 295-302 (1974).

16. *See* ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 28-33; JAFFEE & TRIBE, ENVIRONMENTAL PROTECTION 120-40 (1971).

17. *See generally* ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 42-43; A. TALBOT, POWER ALONG THE HUDSON: THE STORM KING CASE AND THE BIRTH OF ENVIRONMENTALISM (1972).

18. *See* National Environmental Policy Act of 1969 (NEPA), Pub. L. No. 91-190, 83 Stat. 852 (1970). Signed on January 1, 1970, the law quickly became the formal charter of a nationwide environmental "movement." The first "Earth Day" was celebrated on April 3, 1970.

19. *See generally* ELECTRICITY AND THE ENVIRONMENT, *supra* note 6; OFFICE OF SCIENCE & TECHNOLOGY, ELECTRIC POWER AND THE ENVIRONMENT (1970); *Hearings Before the Joint Comm. on Atomic Energy on the Envtl. Effects of Producing Elec. Power*, pts. 1 & 2, 91st

the addition of one million megawatts (Mw) of new capacity between 1970 and 1990,[20] these plans seemed to challenge the very foundations of the emerging environmental movement. Just as people began to perceive the existence of real and perhaps very near "limits to growth,"[21] the electric utility industry projected exponential growth in perpetuity.[22] Understandably, these projections tended to polarize the environmental debate. Battle lines were quickly drawn, and by 1970 any proposal for a new generating station invariably drew stiff opposition from environmentalists who demanded some showing that the new capacity was really "needed."[23]

Today, the problems which ten years ago forced the "need for power" decision from the private boardroom to the public hearing room are even more serious. First, the cost of new power plants has continued to skyrocket.[24] Nuclear units first announced in the early 1970s are now being completed at anywhere from three to ten

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Cong., 1st & 2d Sess. (1969-70) [hereinafter cited as *Atomic Energy Hearings*].

20. *See Atomic Energy Hearings I, supra* note 19, at 55. According to an analysis made by the staff of the Federal Power Commission (FPC), this projection envisioned

> the construction of about 40 new hydroelectric installations of 100 megawatts (Mw) or more, some 50 new pumped storage hydroelectric projects of 300 megawatts or more and about 250 fossil and nuclear steam electric plants having capacities ranging in size from 1000 to 4000 megawatts . . . [as well as] substantial additions at many hydroelectric and steam generating plants currently in service.

Id.

21. *See, e.g.*, D.H. MEADOWS, J. RANDERS, & W. BEHRENS, THE LIMITS TO GROWTH (1972); ROYAL COMM'N ON ENVTL. POLLUTION, FIRST REPORT (1971), and Boulding, *The Economics of the Coming Spaceship Earth*, in ENVIRONMENTAL QUALITY IN A GROWING ECONOMY 3-14 (H. Jarrett ed. 1971). These well-known works illustrate the contemporary concern with the implications of exponential growth.

22. *See, e.g., Atomic Energy Hearings II, supra* note 19, at 1809; ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 161-85. For a collection of comments indicating the range of the controversy sparked by the industry's growth forecasts, see JOINT COMMITTEE ON ATOMIC ENERGY, 92ND CONG., 1ST SESS., NUCLEAR POWER AND RELATED ENERGY PROBLEMS—1968 THROUGH 1970, 10-13, 36-53, 67-82 (Comm. Print 1971).

23. *See, e.g.*, Scenic Hudson Preservation Conf. v. FPC, 453 F.2d 463 (2d Cir. 1971), *cert. denied*, 407 U.S. 926 (1972). *See Atomic Energy Hearings II, supra* note 19, at 1809; *Atomic Energy Hearings I, supra* note 19, at 7, 67-68, 298, 308 (1969); EBBIN & KASPER, *supra* note 15, at 1-14; D. NELKIN, NUCLEAR POWER AND ITS CRITICS 5-19 (1971); JAFFEE & TRIBE, *supra* note 16, at 120-40.

24. *See generally*, KOMANOFF, POWER PLANT COST ESCALATIONS: NUCLEAR AND COAL CAPITAL COSTS, REGULATION AND ECONOMICS (1982); BUPP & DERAIN, LIGHT WATER: HOW THE NUCLEAR DREAM DISSOLVED (1978).

times their original estimated cost.[25] The end, moreover, is nowhere in sight. More stringent reactor regulation in the aftermath of the accident at Three Mile Island has left the future of nuclear capital costs "unknown and unknowable."[26]

At the same time, the typical utility has faced drastically decreased access to capital markets.[27] Lacking external sources of funds, the companies thus have had to seek repeated rate increases from the rate regulators who, also constrained by the imperatives of the capital markets, have had no alternative but to grant them.[28]

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25. *See Special Report* in ENERGY USERS REP. (BNA) No. 371, at 19 (Sept. 18, 1980). The experience of two New York utilities is illustrative. In 1969, the Niagara Mohawk Power Corporation brought into service a 610 Mw reactor which it had built for $188 million, a capacity cost of $270/Kw. In 1972, the company applied for permission to add an 1100 Mw unit at the same site, which it proposed to build by 1978 for $381 million, about $350/Kw. *See* ATOMIC ENERGY COMM'N DRAFT ENVIRONMENTAL STATEMENT: THE NINE MILE POINT NUCLEAR STATION 10-12 (1973). Completion has since been deferred to 1986 and direct construction costs are now estimated to exceed $2.4 *billion*, about $2,200/Kw. *See Special Report, supra*, at 20. *See also* Financial and Economic Cost Implications of Constructing the Nine Mile Point No. 2 Station, NYPSC Opinion No. 82-7, at 18, (Apr. 16, 1982). In 1969, the Long Island Lighting Co. proposed the construction of an 820 Mw reactor which it estimated would cost $261 million, about $300/Kw. *See* Wald, *How the Shoreham Reactor's Costs Soared*, N.Y. Times, Dec. 16, 1980, at 82, col. 4. Originally planned for service in 1975, the unit is now scheduled for completion in 1983 at an estimated cost of $2.2 *billion*, about $2600/Kw. *Id.* at col. 5.

26. This was the conclusion of the New York Energy Planning Board, the agency responsible for planning the energy future of New York State. *See* NEW YORK ENERGY PLANNING BD., STATE ENERGY MASTER PLANNING AND LONG-RANGE ELECTRIC AND GAS SYSTEM PLANNING PROCEEDINGS 116 n.14 (1980) [hereinafter cited as STATE ENERGY PLANNING PROCEEDINGS]. The Tennessee Valley Authority, the largest developer of nuclear power in the country, concurs. *See* ENERGY USERS REP. (BNA) No. 349 at 7-8 (Apr. 17, 1980). *Cf In re* Commonwealth Edison Co., [1979-1981 Transfer Binder] PUB. UTIL. L. REP. (CCH) ¶ 23,227, at 53,686 (Oct. 15, 1980) (discussing the high cost of post-Three Mile Island (TMI) engineering requirements).

27. *See generally* OFFICE OF RESEARCH, N.Y. DEP'T OF PUB. SERV., ALTERNATIVES FOR ELECTRIC UTILITY FINANCING. (1975). A new and disturbing consequence of the electric utility industry's loss of access to traditional capital markets has been an increasing tendency for it to finance construction projects with short-term funds. *See* Bennett, *Banks Fill Utilities' Credit Gap*, N.Y. Times, Feb. 25, 1980, at D1, col. 3. Since a generating unit has a useful life of at least thirty years, this makes it impossible to calculate the capital costs of a plant in advance.

28. Consider, for example, the heroic efforts made by the New York Public Service Commission to relieve the problems experienced by the Long Island Lighting Co. in its struggle to finance its construction of the Shoreham Nuclear Generating Station. *In re* Long Island Lighting Co., 15 Op. NYPSC 15 (1975); *In re* Long Island Lighting Co., 16 Op. NYPSC 497 (1976); *In re* Long Island Lighting Co., 18 Op. NYPSC 45 (1978); *In re* Long Island Lighting Co., NYPSC Opinion No. 79-14 (Apr. 27, 1979). These efforts have been upheld by the courts; *see* Cohalon v. Gioia, 88 A.D.2d 722, 723, 451 N.Y.S.2d 275 (1982) ("economic hardship upon customers may not justify reducing rates below the minimum

These rate increases continue to have serious consequences: They simultaneously aggravate both the conditions of inflation and recession which have combined to produce the intractable problem of "stagflation";[29] they contribute to an erosion of public confidence in government;[30] and they threaten to initiate an accelerating spiral of sales declines which, in the long run, presents a genuine risk of utility bankruptcies.[31]

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necessary for a utility to recover its prudently incurred costs, including a reasonable rate of return on its investment"). Some public utility commissions (PUCs) have attempted to avoid this merry-go-round by prohibiting further investment in new generating units; *see, e.g., In re* Public Serv. Co. of N.H., NUCLEAR REG. REP. (CCH) ¶ 20, 233 (N.H. Pub. Util. Comm'n, July 16, 1982); *Pennslyvania PUC Prohibits Completion of Limerick Unit 2*, 10 ENERGY USERS REP. (BNA) 896 (Sept. 2, 1982).

29. Soaring utility rates have imposed severe hardships on low income consumers. This has sparked a variety of proposals—known generally as "lifeline" —for the redesign of rate structures to enable the poor to obtain "basic" electric service at "affordable" rates. *See, e.g.*, CAL. CODE ANN. § 739 (West 1982) (authorizing the California PUC to designate lifeline volumes of gas and electricity); Lifeline Concept and Electric Rate Structures, 18 Op. NYPSC 1223 (1978). Federal law now requires each of the states to determine whether lifeline rates should be adopted by its utilities. *See* Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, § 114(b), 92 Stat. 3117 (codified at 15 U.S.C. 717 (Supp. V. (1981))). The wisdom and legality of such rates have by now been the focus of extensive debate. *See* Gas & Electric Utility Rate Structure, 24 PUB. UTIL. REP. 4th, at 332 (Apr. 4, 1978) (implementing CAL. PUB. UTIL. CODE, § 739 (1975)); Wilson & Chun, *Equity and Social Ends in Rate-Setting: An Examination of Lifeline Rates*, 16 GONZ. L. REV. 579 (1981); Aman & Howard, *Natural Gas and Electric Utility Rate Reform: Taxation Through Ratemaking?*, 28 HASTINGS L.J. 1083 (1977).

The rising cost of utility services has also contributed to unemployment and, in some instances, the relocation of business and industry. *See* NEW YORK PUB. SERV. COMM'N, STATEMENT OF POLICY CONCERNING EVIDENCE OF ECONOMIC IMPACT ON RATE CASES 3 (1980); *In re* Consolidated Edison Co., NYPSC Opinion No. 79-4 at 2 (Mar. 6, 1979); *In re* Long Island Lighting Co., NYPSC Opinion No. 79-14 at 1 (Apr. 27, 1979) (Comm'rs Mead & Burstein, dissenting). *See also Industrial Users Win TVA Campaign To Defer Three Nuclear Power Plants*, 10 ENERGY USERS REP. (BNA) 251-52 (Mar. 11, 1982) (industrial customers of TVA claim continued construction of nuclear units will cost jobs).

30. This erosion of confidence was especially evident when, in response to the decline in sales which followed the Arab oil embargo, some utilities obtained rate increases which ill-advisedly were termed "conservation adjustments." These increases elicited an outpouring of protest from consumers who felt they were being "penalized" for their successful efforts at conservation. PUC "explanations" did little to soothe their indignation. *See In re* Niagara Mohawk Power Corp., NYPSC Opinion No. 79-5, at 6 (Mar. 8, 1979); *In re* Long Island Lighting Co., NYPSC Opinion No. 79-14, at 1 (Apr. 27, 1979) (Comm'rs Mead & Burstein, dissenting) (10,000 protests and 115 speakers at four days of hearings). *See also In re* Pacific Gas and Electric Co., Cal. PUC Opinion D.82-08-014, at 4 (Aug. 4, 1982) (strong consumer opposition to proposed conservation incentive program because of perception that "when efficiency occurs, rates go up"); Turner, *Pacific Rates Provoke Protest*, N.Y. Times, Mar. 15, 1982, at D7, col. 1.

31. There is growing support among economists for the view that the long run effects of

Second, the health, safety and environmental risks of central station generation also loom larger today than ten years ago. An acceptable method for the permanent disposal of high level nuclear wastes has proven stubbornly elusive.[32] The partial meltdown at Three Mile Island revealed flaws in the fundamental assumptions of reactor licensing while reminding everyone that the possibility of a reactor accident with catastrophic consequences is a continuing reality.[33] The effects of exposure to low level radiation remain a

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electricity price increases are "elastic" and, hence, that "some utilities may see absolute declines in sales of kilowatt hours, and reduced revenue measured in real, deflated dollars." Chapman & Mount, *Electricity Demand and the Financial Problems of Electric Utilities*, in CORNELL UNIV. DEP'T OF AGRIC. ECON. STAFF PAPER No. 74-25, at 11 (1974). The experience of the Consolidated Edison Co. (Con Ed) bears out this warning. Rate hikes and sharply rising fuel costs combined to more than double the average householder's electricity bill between 1971 and 1974. The company's sales declined and revenues were inadequate to finance its ongoing construction program. Bankruptcy was averted only by the intervention of the New York State Legislature, which authorized the Power Authority of the State of New York to purchase from Con Ed, for $612 million, two generating units then under construction which the company could no longer afford to complete. *See* CONSOLIDATED EDISON CO. OF N.Y., 1975 ANNUAL REPORT 3 (1976). The company's rates remain relatively high, however, and have been responsible for the relocation of some energy intensive business from the company's service territory. Recently, in an effort to halt this exodus, the company proposed what it called an "Area Development Credit" (others, less charitably dubbed it a "corporate lifeline"). Essentially, the credit grants a reduced rate for industrial customers who are heavily dependent upon electricity and are encountering economic difficulties. Concluding that the proposed "credit" was not targeted with sufficient precision, the New York Public Service Commission declined to approve it. At the same time, the PSC acknowledged its continuing concern for Con Ed's future, and applauded the company for at least "realizing that creative approaches must be initiated to deal with economic forces that pose a great financial threat to those customers who possess neither the mobility nor the economic resources to find an alternative to the Con Ed system." *In re* Consolidated Edison Co., NYPSC Opinion No. 79-4 at 9 (Mar. 6, 1979).

32. *See generally, Nuclear Waste Management*, 32 S.C.L. REV. 639 (1981); *Symposium on the Management of Nuclear Wastes*, 21 NAT. RESOURCES J. 693 (1981); Note, *Radioactive Waste Management*, 5 HARV. ENVTL. L. REV. 259 (1981). The NRC continues to "study" the problem in the "Waste Confidence" proceeding, a rulemaking initiative begun in 1979 but still far from completion. *See* Storage and Disposal of Nuclear Wastes, 44 Fed. Reg. 61372 (Oct. 25, 1979); Potomac Alliance v. NRC, 682 F.2d 1030, 1038 (D.C. Cir. 1982). *See also* Natural Resources Defense Council v. NRC, 685 F.2d 459 (D.C. Cir.), *cert. granted*, 103 S. Ct. 443 (1982) (vacating NRC rule for assessing the environmental impact of long-term storage of high level nuclear waste).

33. *See, e.g.*, Nuclear Power Plant Accident Considerations Under the National Environmental Policy Act of 1969: Statement of Interim Policy, 45 Fed. Reg. 40,101 (June 13, 1980) (announcing that environmental impact statements issued by the NRC in connection with a proposal to license a nuclear power plant would henceforward include a discussion of the environmental consequences of reactor accidents involving major radiation releases); Pratt, *Catastrophic Nuclear Power Reactor Accidents: An Issue of Safety, A Question of Record*, 14 GA. L. REV. 265 (1980) (concluding that insufficient consideration has been given

subject of debate,[34] acid rain continues to sterilize our lakes and streams,[35] and atmospheric accumulation of carbon dioxide jeopardizes the very life support systems of the earth.[36]

There is also a new concern. Further capacity expansion risks a commitment to bulk power systems (generating stations together with their associated network of transmission lines) which may be irreversible. Some have suggested that such a commitment will lead inevitably to a future of plutonium-fueled breeder reactors.[37] Others, who believe such fears to be exaggerated, nevertheless acknowledge that continued expansion of bulk power systems does at least threaten to stultify newly emerging energy supply options, including conservation measures and small scale decentralized energy sources.[38] The development of these alternative energy sources may be thwarted in two ways: 1) The capital needed to realize their potential could be forfeited to the staggering capital requirements of the industry's bulk power expansion plans; and 2) even if the capital needed to finance alternative sources remains available, the revenue required to cover the costs of bulk power expansion might make it politically intolerable to permit consumers to invest in these alternatives and withdraw from the bulk power system.[39]

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to the likelihood and consequences of a catastrophic nuclear reactor accident). A recent NRC study concludes that the "worst case" death toll for a severe reactor accident could surpass 100,000 and the damage from such an accident could exceed $300 billion. *See* 10 ENERGY USERS REP. (BNA) 1104-05 (Sept. 30, 1982).

34. *See, e.g.*, GENERAL ACCOUNTING OFFICE, PROBLEMS IN ASSESSING THE CANCER RISKS OF LOW LEVEL IONIZING RADIATION EXPOSURE (1980).

35. 10 COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY: THE TENTH ANNUAL REPORT 70-71 (1979) ("Acid rain is recognized as one of the two most serious global environmental problems associated with fossil fuel combustion . . ."). In 1980, Congress created the Acid Precipitation Task Force and charged it with the responsibility of making available further information about the sources, formation, transport, effects and possible control of acid rain. *See* Acid Precipitation Act of 1980, Pub. L. No. 96-294, 94 Stat. 770-75 (codified at 42 U.S.C. § 8901 (1980)). While studies continue, the problem grows worse. *See generally* 12 COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY: THE TWELFTH ANNUAL REPORT, 45-48, 192 (1982).

36. *See, e.g.*, COUNCIL ON ENVTL. QUALITY, GLOBAL ENERGY FUTURES AND THE CARBON DIOXIDE PROBLEM (1981); SAYRE, VALUES IN THE ELECTRIC POWER INDUSTRY (1977); Sullivan, *Increased Burning of Fuels Could Alter Climate*, N.Y. Times, Nov. 20, 1979, at C1, cols. 3-5.

37. *See* B. COMMONER, THE POLITICS OF ENERGY (1979).

38. *See infra* note 39 and accompanying text.

39. *See* LOVINS, SOFT ENERGY PATHS: TOWARD A DURABLE PEACE 59-60 (1977); *but see* Rossin, *The Hidden Costs of Soft Energy*, 6 EPA J. 32 (1980). In the view of the Environ-

B. *The Continuing Need for Regulation of Capacity Expansion*

The societal interest in the expansion plans of the nation's electric utilities is thus clear; whether governmental intervention is required to protect that interest is not so obvious. Under perfect competition there are, of course, no incentives for producers to invest "too much" capital in a plant; overexpansion would simply cause a decline in profits. The economics of electricity supply, however, are very different. Rate regulation and the federal tax laws may operate to provide electric utilities with financial incentives to overestimate future demand. At the same time, the companies are protected by regulation from the risks of overexpansion.

1. *Rate regulation and the tax laws: Stimulants to overexpansion.* Under traditional rate regulation, utilities are allowed revenues supposedly sufficient to enable them to recover their costs of service and to earn a reasonable return on their investment.[40] In theory, a reduction in costs does not automatically result in greater profits; these flow only from an increase in the company's rate base (its total invested capital) or an increase in its allowed rate of return.[41] From this, some economists have inferred that utilites are "biased" in favor of capital investments, favoring rate base maximization over cost minimization.[42] Others have ar-

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mental Defense Fund, which favors increased investment in conservation and small scale renewable energy sources over the conventional (coal-fired) capacity expansion plans of California's electric utilities, "you can't have *both* the [new coal] plant *and* conservation. And conservation is cheaper." Leydet, *Coal vs. Parklands*, NAT'L GEOGRAPHIC, Dec. 1980, at 776-803. For a similar view, see NEW YORK STATE DEP'T OF PUB. SERV., STAFF POSITION PAPER ON ELECTRIC GENERATION PLANNING, 63-66 (1979). *See also* Feder, *Seal-Kap Cuts Loose from Con Ed*, N.Y. Times, Aug. 24, 1980, § 3, at 4, col. 1 (reporting efforts by Con Ed to squelch the development of small-scale cogeneration in its service territory because, *inter alia*, it "drives up the cost of supplying electricity to other customers").

40. *See generally* 1 A. KAHN, *supra* note 9, at 20-54.

41. In reality, a reduction in operating costs can lead to greater profits because of "regulatory lag." A company's revenue requirement is determined on the basis of costs and revenues which are forecast for the "rate year." If actual costs are below those forecast, and revenues materialize as projected, earnings will exceed those allowed. This has not happened very often recently because PUCs traditionally have based forecast costs on historical costs, and inflation has tended to assure that actual costs incurred in the rate year will be greater than those forecast, resulting in lower earnings than those theoretically allowed. One regulatory response to this problem of "earnings erosion" has been the increased use of forecast rather than historical operations as the basis for fixing rates. *See, e.g.*, NEW YORK PUB. SERV. COMM'N, STATEMENT OF POLICY ON TEST PERIODS IN MAJOR RATE PROCEEDINGS 3 (1977).

42. The seminal works are Averch & Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052 (1962), and Wellisz, *Regulation of Natural Gas Pipe-*

gued that any such bias (known as the "A-J-W effect") is more theoretical than real,[43] but ample evidence confirming its influence on electric utility investment priorities can be found in many of the industry's practices.[44] These practices include the industry's notorious refusal to achieve lower production costs through interconnection, wheeling, pooling and other efforts at system coordination;[45] its maintenance of unnecessarily large capacity reserves;[46]

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line Companies: An Economic Analysis, 71 J. POL. ECON. 30 (1963). *See also* Johnson, *The Averch-Johnson Hypothesis After Ten Years*, in REGULATION IN FURTHER PERSPECTIVE: THE LITTLE ENGINE THAT MIGHT 67 (W. Shepherd & T. Geis ed. 1974); E. BERLIN, C. CICCHETTI & W. GILLEN, PERSPECTIVE ON POWER 60-64 (1974).

43. *See, e.g.* KAHN, *supra* note 9, at 106-07 (agreeing that "the 'A-J-W effect' . . . undoubtedly describes a real tendency," but arguing that it is overcome by "offsetting forces," *id.* at 50); Corey, *The Averch and Johnson Proposition: A Critical Analysis*, 2 BELL J. 358 (1971). Of course, even in theory the A-J-W effect should disappear when the regulated firm's cost of capital exceeds its real (after tax) rate of return; *see* KAHN, *supra* note 9, at 56.

44. *See, e.g.*, Spann, *Rate of Return Regulation and Efficiency in Production: An Empirical Test of the Averch-Johnson Thesis*, 5 BELL J. 38 (1974); Courville, *Regulation and Efficiency in the Electric Utiltity Industry*, 5 BELL J. 53 (1974); Peterson, *An Empirical Test of Regulatory Effects*, 6 BELL J. 111 (1975).*

45. The industry's preference for construction over coordination has been well documented. *See* Breyer & MacAvoy, *The Federal Power Commission and the Coordination Problem in the Electric Power Industry*, 46 S. CAL. L. REV. 661 (1973). Writing ten years after the FPC had estimated that the industry's failure to better coordinate bulk power supply cost consumers between one and two billion dollars a year, the authors observed that the coordination problem remained "serious." Curiously, while they acknowledged that the A-J-W hypothesis might explain the industry's intransigence, they concluded that it was caused by other, more subtle, factors. *Id.* at 686-94. For the view that the A-J-W effect was implicated, see Shepherd, *Utility Growth and Profits Under Regulation*, in UTILITY REGULATION: NEW DIRECTIONS IN THEORY AND POLICY 12, 51-53 (W. Shepherd & T. Geis ed. 1966). The problem has lingered and recently has been addressed by Congress, with legislation increasing the authority of the federal government to require individual utilities to establish transmission interconnections and to wheel power. *See* Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, §§ 210-11, 92 Stat. 3117, 3135-36, (codified at 16 U.S.C. §§ 824i-824j (Supp. IV. 1980)). *See also In re* Empire State Power Resources, Inc., NYPSC Opinion No. 79-10 (Apr. 12, 1979)(Chairman Zielinski, concurring). The opinion critcizes refusal of the New York power companies to reduce the costs of planning, constructing and operating new generating facilities through formation of a statewide service company. The companies had instead sought PSC approval of "ESPRI," a far more capital-intensive scheme for reducing new capacity costs.

46. Most bulk power systems have been designed to assure that the probability of a "loss of load" would not exceed one day in every ten years; *see* FEDERAL POWER COMM'N, THE 1970 NATIONAL POWER SURVEY, pt. II, ch. 5 (1970); NEW YORK POWER POOL, GENERATION RELIABILITY AND RESERVE REQUIREMENTS 2 (1972). The New York Power Pool has a self-imposed reliability criterion which "presumes that there will be actual customer disconnections of a fairly limited duration *no more frequently than once in every 100 years.*" *See In re* Long Range Electric Plans, 16 NYPSC 1025, 1031 (pt. III 1976) (emphasis added). The individual companies generally have been expected to maintain a generating reserve of

its preference for nuclear over coal-fired generation;[47] its initial resistance to peak load pricing and other load management techniques;[48] and, most recently, its continuing failure to explore the system savings which might accrue from the installation of smaller generating units.[49]

This bias in favor of capital investment is further intensified by the federal tax laws; indeed, the effect of these laws on electric utility capacity expansion can be dramatic. An investment in excess of one billion dollars for a new power plant provides its owner with a large income tax deduction for interest expense[50] and a large investment tax credit.[51] Even after the plant has been built, the company's investment continues to be the source of a large deduction through accelerated depreciation.[52] Taken together, these deductions and credits associated with new and existing plants can operate to shelter much of a utility's income from taxation; in

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about 20% of their peak loads; *see, e.g.*, FEDERAL POWER COMM'N, THE 1970 NATIONAL POWER SURVEY, *supra*. As a result of both past load growth and new capacity costs, these reserves have become extraordinarily expensive, prompting the New York PSC to observe that "consumers are being asked to pay for a higher degree of reliability than has been demonstrated to be economic." *See In re* Long Range Electric Plans, 16 Op. NYPSC at 1031. Unchastened, the New York Power Pool subsequently concluded that its reserve margin should be *increased* from 22% to 23% simply to enable it to continue to meet its "one day in ten year" loss of load probability criterion. *See* 1 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC SYSTEMS 333 (1978). In 1979, however, the Pool altered the basis for evaluating its generating reliability to incorporate consideration of the impact of emergency procedures regularly followed by electric system operators confronted by capacity deficiencies. This change returned the Pool's required reserve margin to 22%, which it claims is cost justified; *see* 2 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC SYSTEMS 59-64 (1979). This margin presently requires the New York companies to maintain an aggregate generating reserve of about 4,000 MW.

47. Most analyses have concluded that nuclear power no longer enjoys any economic advantage over coal-fired generation; *see generally* Bupp, *The Nuclear Stalemate*, in ENERGY FUTURE, *supra* note 3, at 108-35. The industry's claim to the contrary has met with increasing skepticism. Wisconsin has barred further nuclear expansion in order to avoid economic catastrophe; *see In re* Advance Plans for Construction of Facilities, NUCLEAR REG. REP. (CCH) ¶ 20,093 (Wisc. PSC, Aug. 17, 1978).

48. *See* KAHN, *supra* note 9, at 50 & n.10.

49. *See* Boyd & Thompson, *The Effect of Demand Uncertainty on the Relative Economics of Electrical Generation Technologies with Differing Lead Times*, 4 ENERGY SYS. & POL'Y J. 99 (1980); *In re* Long Range Electric Plans, NYPSC Opinion No. 78-3, at 6-7 (Mar. 6, 1978) ("Given the uncertainties about long range demand for electricity . . . it is at least conceivable that it would make more sense to be planning several small plant additions, . . . rather than a single, large base-load facility").

50. 26 U.S.C. § 163 (1976).

51. *Id.* § 38.

52. *Id.* § 167.

many cases they are large enough to offset *wholly* a company's nominal 46% tax rate.[53] The tax code thus provides the utilities with powerful incentives to construct a new plant and then to retire it from service, regardless of whether such construction or retirement is otherwise economically prudent.[54]

2. *"Used and Useful": A failed constraint.* Notwithstanding these incentives for overinvestment, utilities always have claimed that capacity planning was cost justified[55] and that overexpansion is effectively constrained by traditional rate regulation which permits a utility to earn a return only on investment in a plant which is "used and useful."[56] A power plant that was not needed would not satisfy this condition, would not be included in a utility's rate base,[57] and thus, from a stockholder's point of view, would re-

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53. *See* Davis, *Federal Tax Subsidies For Electric Utilities: An Energy Policy Perspective*, 4 HARV. ENVTL. L. REV. 311 (1980). In 1974, when the federal investment tax credit was only 4%, the net income before taxes of the seven investor-owned utilities in New York was $478 million. Their effective tax rate—as opposed to the statutory rate of 46%—was *eight tenths of one percent.* STATE CONSUMER PROTECTION BOARD PETITION TO NYPSC FOR A GENERIC PROCEEDING ON THE ECONOMIC COSTS OF NUCLEAR POWER 20-22 (1976). Nationwide, investor owned utilities in 1975 paid an average aggregate of less than 2% of their operating revenues in federal income taxes, "a significant number" paid no federal income taxes at all, and "many actually received tax refunds from the Federal treasury." *See APPA Comments on the National Power Grid Study*, in THE NATIONAL POWER GRID STUDY, *supra* note 6, at 4 (1980).

54. *See* Davis, *supra* note 53.

55. *See, e.g., Long Range Planning Reports*, filed annually since 1973 by the member systems of the New York Power Pool, pursuant to N.Y. PUB. SERV. LAW § 149(b) (McKinney 1982), and N.Y. ENERGY LAW §§ 5-112 (McKinney 1982).

56. *See generally* 2 A. PRIEST, PRINCIPLES OF PUBLIC UTILITY REGULATION 142-77 (1969). For recent applications of the "used and useful" rule, see Office of Consumers' Counsel v. Ohio PUC, 67 Ohio St. 2d 153, 167-68, 423 N.E.2d 820, 829 (1981), *app. dismissed*, 455 U.S. 914 (1982); *see also In re* Jersey Central Power and Light Co., 85 N.J. 520, 428 A.2d 498 (1981) (upholding exclusion of T.M.I.-1 from rate base because of outage of indefinite duration); City of Cleveland v. Public Utilities Comm'n, 63 Ohio St. 2d 62, 406 N.E.2d 1370 (1980). In *In re* Metropolitan Edison Co. & Pa. Elec. Co., NUCLEAR REG. REP. (CCH) ¶ 20,160 (Pa. Pub. Util. Comm'n, May 23, 1980); In *In re* Attorney Gen. v. Michigan Pub. Serv. Comm'n, 412 Mich. 385, 316 N.W.2d 187 (1982), the court's holding—that the Michigan PSC lacked the statutory authority to consider the need for a new powerplant on a utility's application for approval to issue securities—was expressly premised on the assumption that a facility which was not needed could not be included in the utility's rate base, and that the risk of excess capacity thereby remained with the company's investors rather than its ratepayers.

57. *Cf.* City of Cleveland v. Public Utilities Comm'n, 63 Ohio St. 2d at 62, 406 N.E.2d at 1270 (upholding decision of Ohio PUC to include Cleveland Electric's $306 million investment in the Davis Besse Nuclear Generating Station in the company's rate base even though the new plant's capacity was not required to meet reserve margins, but *only* because

present a billion dollar white elephant. Why then, the companies ask, would utility management intentionally invest in excess capacity? In theory, they would not,[58] but in reality they do because regulation actually operates to insulate shareholders from the theoretical risks of overexpansion.

First, exceptions to the "used and useful" rule have arisen because of the economic realities of modern day power plant construction; new power plants cost too much and take too long to complete for a typical utility to forego all return on its investment in a new facility until it is brought into service. From the moment a company first incurs expenses in connection with the construction of a new generating station, it will receive, at the very least, an allowance for funds used during construction, known as AFC.[59] While this is a noncash allowance, AFC immediately increases a company's net income and earnings, and ultimately shifts the carrying costs of construction from the company's stockholders to its future ratepayers.[60] Of course, the augmentation of income by a mere book entry will not suffice when a utility is hard pressed for cash, and this is a particularly commonplace condition for utilities endeavoring to finance expansion. In these circumstances it has become common for rateregulators to allow a company's rate base to include not only a plant which is used and useful, but construction work in progress (CWIP) as well.[61] The effect of this accounting

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generation from the plant had reduced overall system production costs and thereby led to lower rates).

58. *But see* Maher, *The Dynamics of Growth in the Electric Power Industry*, in VALUES IN THE ELECTRIC POWER INDUSTRY (K. Sayre ed. 1977) (arguing that electric utilities will invest in excess capacity because "growth" rather than "profit maximization" is the paramount decision criterion of management).

59. *See generally* J. SUEFLOW, PUBLIC UTILITY ACCOUNTING: THEORY AND APPLICATION (1973). There is, of course, nothing improper about an allowance for AFC. When a lengthy, expensive construction project is undertaken, a company uses funds from a variety of sources. Some funds may be raised "externally" by the sale of debt securities; some may be raised "internally" from retained earnings. When funds are raised externally, actual interest charges are incurred and these charges are capitalized as a cost of construction. Although no actual interest charges are incurred on equity capital, such funds do remain unproductive during the construction period and, in a sense, the return foregone during this period is also a cost of construction. This cost is called AFC and is capitalized, as are other construction costs. *Id.* at 178-80.

60. These carrying costs can be enormous for a new power plant. For example, it has been estimated that a reduction in the construction period of the Shoreham Nuclear Generating Station, an 820 Mw facility being built by the Long Island Lighting Co., will save carrying charges of $300,000 *per day*. NEW YORK PSC, PRESS RELEASE No. 78246 (1978).

61. *See, e.g.*, Cohalon v. Gioia, 88 A.D.2d 722, 451 N.Y.S.2d 275 (1982) (two hundred

legerdemain is to provide the company with an immediate cash return on its investment in a new plant, thus shifting the carrying costs of new construction from the company's stockholders to its current ratepayers.[62] Any deterrent to overexpansion which results from having these costs borne by stockholders is, of course, lost in the bargain.

Secondly, even when state rateregulators purport to apply the "used and useful" rule, they cannot rigorously administer it since

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million dollar CWIP added to rate base to enable completion of nuclear generating unit). According to a report recently issued by the General Accounting Office, as of April, 1979, thirty-three PUCs had allowed CWIP to be included in rates. *See* GENERAL ACCOUNTING OFFICE, CONSTRUCTION WORK IN PROGRESS ISSUE NEEDS IMPROVED REGULATORY RESPONSE FOR UTILITIES AND CONSUMERS (1980).

In the exercise of its jurisdiction over wholesale sales of electricity in interstate commerce, the Federal Energy Regulatory Commission (FERC) has allowed a utility to include CWIP in its rate base only with respect to pollution control or coal conversion projects, or in cases of "severe financial difficulty," a vague term which the FERC has not yet had the opportunity to amplify by decision. In one case now pending, an administrative law judge has recommended that the Public Service Co. of New Hampshire be allowed to include the ongoing construction costs of its Seabrook Nuclear Generating Station in its wholesale rate base because the company would otherwise be unable "to generate sufficient cash to meet its cash obligations, including interest on its debt and dividends on its stock." *See* PUB. SERV. CO. OF N.H., No. EL 78-15 (Initial Decision, Jan. 26, 1979). Since this type of cash flow problem is today commonplace among utilities attempting to finance ambitious construction programs, if this decison is upheld it will mean that the "severe financial difficulty" test can be met rather readily. A determination by FERC is now anticipated in the context of a rulemaking proceeding, *see* Construction Work In Progress For Public Utilities, 46 Fed. Reg. 3944 (Aug. 3, 1981) and 47 Fed. Reg. 1676 (Jan. 13, 1982). *See also* Hobelman, Knapp & Walsh, *Construction Work In Progress For Electric Utilities: A Compendium of Comments Presented To The Federal Energy Regulatory Commission In Docket No. Rm. 81-83*, 277 PRAC. L. INST. 65 (1980).

62. Arguably, the inclusion of CWIP in a company's rate base may be of benefit to ratepayers too, at least in the long run. First, AFC would not be charged with CWIP included in the rate base. Second, the inclusion of CWIP in rate base results in improved cash earnings which, in turn, may enable the company to finance the remainder of construction at lower costs. In either case, the company's rate base in the future (after the plant goes into service) would be commensurately reduced. Future ratepayers (a class perhaps roughly conterminous with current ratepayers) would thus incur a smaller revenue obligation with respect to the plant. It is clear, however, that current ratepayers remain unwilling to bear the immediate costs of CWIP, notwithstanding this promise of future benefits. *See In re* Niagara Mohawk Corp., 16 Op. NYPSC 914, 914-16 (1976). Indeed, Meldrim Thompson lost the govenorship of New Hampshire when he proposed that the ongoing construction costs of the controversial Seabrook Nuclear Generating Station be included in its owner's rate base. The New Hampshire Legislature subsequently prohibited that accounting procedure. *See* D. STEVER JR., SEABROOK AND THE NUCLEAR REGULATORY COMMISSION 111-32 (1980). In most states, however, rate making treatment of CWIP remains within the regulatory discretion of a PUC. *See, e.g.*, Cohalon v. Gioia, 88 A.D.2d 722, 451 N.Y.S.2d 275 (1982); Consumer Protection Bd. v. Public Serv. Comm'n, 78 A.D.2d 65, 434 N.Y.S.2d 820 (1980).

the exclusion of a billion dollar facility from a utility's rate base is likely to devastate its financial condition.[63] Overexpansion thus leaves public utility commissions (PUCs) facing a dilemma: If surplus capacity is included in a company's rate base, consumers will be charged for a plant from which they receive no benefit; on the other hand, if the new plant is excluded from the rate base, AFC charges will continue to accumulate, the company's earnings will deteriorate, its cost for the capital needed to provide continuing service will increase, and consumers once again will face higher rates.

The problem is well illustratated by the history of the $220 million oil-fired plant known as Oswego No. 4, which was brought into service by the Niagara Mohawk Power Corporation in February, 1976.[64] At the time, the company already had substantial excess capacity, and installation of the new unit increased its generating reserve to 47%, well above the company's 18% reserve margin requirement.[65] Moreover, while the running costs of the plant were lower than those of older, oil-fired plants within the company's system, the new unit could not be justified economically since its high fixed costs raised total production costs above those of the company's existing capacity.[66] Consumers therefore challenged the company's decision to bring the unit into service, and urged that the plant be excluded from the company's rate base.

The New York Public Service Commission (PSC) acknowledged the "conceptual attractiveness"[67] of continuing to accrue AFC while excluding the new unit from the company's rate base and thereby allocating the costs of carrying excess capacity to the future customers it might serve. Nevertheless, the PSC rejected this solution because it would have resulted in the company receiv-

63. *See, e.g., In re* Jersey Cent'l Power & Light Co., 85 N.J. 520, 428 A.2d 498 (1981). There, to offset decrease in revenues of $17.9 million caused by removal of TMI-1 from rate base, the New Jersey PUC ordered that recovery of the company's deferred energy account be accelerated in an equivalent amount. *See also* Jones, *An Example of a Regulatory Alternative to Antitrust: New York Utilities in the Early Seventies*, 73 COLUM. L. REV. 462, 481 (1973) (rate base exclusion as a sanction "more theoretical than real"). *But see In re* Metropolitan Edison Co., Pa. PUC Opinion No. I-79040308, at 468 (June 15, 1979) (expressing skepticism about the risk of bankruptcy for General Public Utilities Corp. incident to removal of TMI-2 from rate base).

64. *In re* Niagara Mohawk Power Corp., 16 Op. NYPSC 911 (Nov. 16, 1976).

65. *Id.* at 924.

66. *Id.* at 924-25.

67. *Id.* at 925.

ing cash earnings insufficient to finance its ongoing construction program.[68] Another 850 Mw oil-fired unit, Oswego No. 6, was then scheduled for service in 1980, and an 1,100 Mw nuclear unit was scheduled for addition to the company's system in 1982.[69] Financing these projects had already resulted in large AFC (noncash) earnings, and it was feared that a further increase in the company's ratio of AFC-to-cash earnings might lead to an increase in the company's cost of capital and, consequently, to higher rates for future ratepayers. The new unit was therefore included in the company's rate base. While this solution was supposedly in the long-run best interests of the company's ratepayers,[70] it presents the appearance of a "catch-22" by requiring ratepayers to pay for past overexpansion so that further expansion might continue uninterrupted.

Under these circumstances, the "used and useful" rule actually may operate to promote overexpansion. Commitments to new generating stations must be made ten to sixteen years in advance, on the basis of load and capacity projections made with considerable uncertainty. This uncertainty diminishes as the target year approaches, but by that time millions of dollars have already been invested in site acquisition, site preparation, engineering and, perhaps, construction. Under the "used and useful" rule, these expenses are capitalized and will earn no return until the plant goes into service. Thus, even if new projections suggest that new generating capacity will not be needed as soon as originally had been thought, utility management nevertheless may be tempted to ignore the new projections and complete the facility before it is needed.[71]

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68. *Id.*

69. *Id.* at 929.

70. *Id.*

71. In such cases, it has become commonplace for the companies to endeavor to justify this "early" addition of new capacity by claiming that energy from the new plant (whether nuclear or coal-fired) will be more economical than energy from existing oil-fired facilities. *See, e.g.*, 2 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC SYSTEMS 4-8 (1979). On close examination these claims often have been found unpersuasive. *See infra* text accompanying notes 117-22. Of course, the deferral or cancellation of scheduled plants sometimes cannot be avoided, particularly when pressing cash problems are present. *See, e.g., In re* Detroit Edison Co., NUCLEAR REG. REP. (CCH) ¶ 20,035 (Mich. Pub. Serv. Comm'n, July 26, 1976). Under traditional accounting procedures the costs of deferral will be paid by future ratepayers through allowances for AFC. Investment in a cancelled project also will be recouped from ratepayers, at least where it cannot be said that the original undertaking was

Adding to this temptation to throw good money after bad is the knowledge that the additional outlay required to complete the plants only makes it more difficult for the sanction of rate base exclusion to be employed. Clearly, the sanction may be threatened, but the utility companies have learned that such threats are empty. Thus, in a virtual replay of its 1976 rate treatment of Oswego No. 5, the New York PSC later permitted Niagara Mohawk to begin earning a return on yet another generating unit, Oswego No. 6, even though this plant was also brought into service long before it was needed.[72]

Obviously, once the investment in capacity expansion has been made, rateregulators simply are left with too little room in which to maneuver.[73] As a result, much of today's rate regulation appears to be a classic case of locking the barn door after the horse has been stolen. Constrained by the imperatives of the capital markets, the PUCs too often simply have no alternative but to grant a rate award which augments utility earnings.[74] Their discretion lies not in deciding whether to grant a rate increase, but rather in choosing the accounting technique by which an unavoidable rate increase can be effectuated. Accordingly, the "used and useful" rule, administered in the context of traditional rate regulation, cannot operate as an effective deterrent to overexpansion.

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imprudent. *Id.*; *see also In re* Rochester Gas and Elec. Corp., NYPSC Opinion No. 82-1 at 15 (Jan. 12, 1982). *But see Office of Consumer's Counsel v. Pub. Serv. Comm'n: Who Shall Bear The Cost Of Abandonment*, 11 CAP. U.L. REV. 91 (1981).

72. *See In re* Niagara Mohawk Power Corp., NYPSC Opinion No. 80-7 at 44-45 (Feb. 29, 1980).

73. Imaginative regulation sometimes may make the burden of excess capacity easier to bear. For example, while the New York PSC felt constrained to include Niagara Mohawk's $220 million investment in Oswego No. 5 in the company's rate base even before the capacity from this unit was needed on the company's system, it sought to soften the impact of full recognition of the facility in the company's rates by "imputing" to the company 1% more sales ($6,750,000 in revenues) during the rate year than the company had projected. Since the total revenue requirement associated with the plant was about $21,500,000, this required current ratepayers to supply only $14,750,000 ($21,500,000 less $6,750,000), and shifted to the company's stockholders the risk that the imputed sales ($6,750,000) would not materialize. While the PSC described this unequal sharing of the costs of excess capacity as "equitable," it should be noted that the accounting artifice employed—the imputation of more sales than the company had predicted for the rate year—provided the company with an incentive to promote sales rather than conservation, and thus conflicted with other important regulatory objectives. *See In re* Niagara Mohawk Power Corp., 16 Op. NYPSC 924-26 (Nov. 16, 1976).

74. Thus, for example, the construction of the Shoreham plant has led to five major rate increases for Long Island Lighting Co. in just six years; *see supra* note 28.

II. The Current Regulatory Framework

A. *The Basic Approach and Its Failure*

Many states require some demonstration of "need" *before* a new power plant may be built.[75] In some states this showing must be made to a PUC on an application for a certificate of public convenience and necessity;[76] in others it is made to an agency which administers a power plant siting law.[77] In addition, where a nuclear or hydroelectric unit is proposed, "need" determinations are also made either by the Nuclear Regulatory Commission (NRC) or the Federal Energy Regulatory Commission (FERC).[78] In essence, the approach taken by these many different agencies is essentially the same: 1) A decision to add new generating capacity is initially made by company management. 2) An application for approval is then submitted to the appropriate state and federal agencies. In this application, the social desirability of the proposed facility is alleged to be a "need" for additional power, supposedly established by the company's ten to twenty year forecasts of its energy and capacity requirements. 3) Other forecasts, differing widely from the company's, are subsequently offered by opponents of the proposed expansion. 4) The governmental decision maker must choose from among these competing views of the distant future, which it does only after what purports to be a rigorous analysis, often involving cross-examination and other trial-type procedures.

At first glance, this approach might appear to be adequate; at the very least it is traditional. Substantively, it continues the regulatory tradition of leaving investment initiatives to the private sec-

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75. *See* Department of Energy, The Need for Power and the Choice of Technologies: State Decisions on Electric Power Facilities 5-8 (1981) (thirty-eight states require certification of power plants, which generally requires some demonstration of need. Delaware requires a certification, but determines need by its rate and general supervisory powers. Fifteen states also use financial approvals as a means of need for power review. Twenty-three states also make a need for power determination during rate approval. Only five states do not determine need at all: Georgia, Indiana, South Dakota, Rhode Island, Oklahoma).

76. *Id.*

77. *See generally* General Accounting Office, Electricity Planning—Today's Improvements Can Alter Tomorrow's Investment Decisions 20-24, 115-26 (1980) [hereinafter cited as Electricity Planning]; Nuclear Regulatory Comm'n, Improving Regulatory Effectiveness in Federal/State Siting Actions 5-7 (1977).

78. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 1 N.R.C. 347, 352-72 (1975); *In re* Appalachian Power Co. (Blue Ridge Project), 5 PUR 4th 334, 346-47 (FPC 1974), *aff'd sub nom.* State of North Carolina v. FPC, 533 F.2d 702 (D.C. Cir.), *vacated and remanded*, 429 U.S. 891 (1976).

tor, reserving only a reactive role for the public regulator.[79] Procedurally, it incorporates the familiar decision-making process of adversary adjudication. Despite these traditional features—indeed, perhaps because of them—the current approach to government regulation of electric utility capacity expansion, when judged by its results, has had little success. Excess generating capacity exists in most areas of the country, yet the nation's utilities continue to pursue ambitious plans for further expansion.[80] At the same time, investments which could produce more energy less expensively are simply not being made.[81] The Council on Environmental Quality, for example, has estimated that a "strong, sustained commitment" to conservation could obviate the need for 425 of 561 large coal and nuclear power plants by the year 2000.[82] Similarly, the Environmental Defense Fund, examining a proposal by Pacific Gas and Electric Company to double its installed capacity by the year 2000 (with three-fourths of this expansion coming from ten new coal and nuclear units), concluded that everyone (including the utility's stockholders) would be better off with a plan under which 90% of the company's planned coal and nuclear expansion is displaced by investments in conservation and alternative energy sources.[83] In-

79. The essence of this tradition is summed up by a well-known aphorism: "Management proposes and the commission disposes." *See* KAHN, *supra* note 9, at 47; BERLIN; CICCHETTI, & GILLEN, *supra* note 11, at 53.

80. For example, in 1979 the New York utilities had 4,300 Mw (20%) of "excess" capacity—that is, installed capacity even *beyond* a 22% reserve—yet proposed a fifteen year generation expansion plan calling for the construction of more than 12,000 Mw of new capacity, requiring more than $18 billion in capital outlays. *See* 2 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC SYSTEMS 1-6 (1979). Nationwide, while surplus generating capacity also approached 20%, the utility industry continued to forecast capacity deficiences requiring the addition of 233,500 Mw of new generating capacity by 1989, at an estimated cost of $333 *billion*. *See* DEPARTMENT OF ENERGY, ELECTRIC POWER SUPPLY AND DEMAND FOR THE CONTIGUOUS UNITED STATES 1980-1989, I-2 (1980). The Environmental Action Foundation, a consumer group, claims that of one hundred companies it surveyed, seventy-eight had more capacity than needed. *See* ENVIRONMENTAL ACTION FOUND., POWER LINE 4 (Jan. 1978).

81. *See generally* ELECTRICITY PLANNING, *supra* note 77; CALIFORNIA ENERGY COMM'N, ENERGY CHOICES FOR CALIFORNIA—LOOKING AHEAD (1979); NEW YORK STATE ENERGY OFFICE, STATE ENERGY MASTER PLAN AND LONG-RANGE ELECTRIC AND GAS REPORT (draft rep. 1979). *See also In re* Pacific Gas and Electric Co., Cal. PUC Opinion D.89316, at 48-61 (Sept. 6, 1978) (criticizing company for failure to invest in conservation and alternative energy sources); *In re* Pacific Gas and Electric Co., Cal. PUC Opinion D.91107, at 180-86 (Dec. 19, 1979) (penalizing company for failure to invest in cogeneration).

82. COUNCIL ON ENVTL. QUALITY, THE GOOD NEWS ABOUT ENERGY 19-27 (1979).

83. *See generally* WILLEY, ALTERNATIVE ENERGY SYSTEMS FOR PACIFIC GAS & ELECTRIC CO.: AN ECONOMIC ANALYSIS (1978). On the basis of this study, the California Environmental Defense Fund (EDF) is opposing an application by Pacific Gas and Electric to the Califor-

deed, the economic efficiency of these nonconventional investments may warrant, in some cases, the actual abandonment and write-off of ongoing power plant construction projects.[84] Despite all this, central station expansion continues.

Adding insult to injury, the regulatory process itself has proven cumbersome and costly, wasting a great deal of time, effort and money. Litigation before the NRC concerning the need for a nuclear facility usually involves lengthy hearings[85] and often duplicative state proceedings. A 1974 proposal to build an 1,150 Mw nuclear unit in upstate New York, for example, triggered two proceedings: one before the NRC and the other before the New York State Board on Electric Generation Siting and the Environment. The NRC proceeding was typical, involving more than twenty days

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nia PUC for permission to participate in the Allen-Warner Valley Project, a 2,500 Mw coal-fired complex planned to be built in wilderness areas of Utah and Nevada. EDF contends that the California utility could develop the equivalent capacity from alternative sources, such as geothermal steam, wind turbines and cogeneration, at a savings of $500 million. *See Can Soft Energy Save Hard Cash?*, N.Y. Times, Aug. 11, 1980, at A26, cols. 1-2; *see also* Leydet, *Coal vs. Parklands*, 158 NAT'L GEOGRAPHIC 777 (Dec. 1980). While the company initially disputed the EDF study, it has recently announced a change in its "overall resource plans," consisting of a reduction in the size of the Allen-Warner Valley Project and an increased commitment to a number of residential and commercial conservation programs. *See California Utilities Reassess Role in Allen-Warner Electricity Project*, ENERGY USERS REP. (BNA) No. 393 at 321 (Feb. 19, 1981).

84. *See* GENERAL ACCOUNTING OFFICE, HYPOTHETICAL TRANSFER OF CONSTRUCTION FUNDS FROM NUCLEAR POWERPLANTS TO ELECTRICITY CONSERVATION AND RENEWABLE ENERGIES (April 4, 1980). WNP-4 and WNP-5 were two of five 1,250 Mw nuclear units being built by a consortium of eighty utilities (including public utility districts, cities and cooperatives) in the State of Washington. As of March 31, 1980, WNP-4 was 13% complete and WNP-5 was 8% complete, "sunk" construction costs totalled $1.6 billion, and completion was estimated to cost an additional $4 billion. The GAO concluded that if these funds were instead diverted to energy conservation and renewable energy sources, a roughly equivalent amount of capacity could be available by 1987 at a cost of from $2.9 billion to $3.5 billion (a savings of from $.5 to $1.1 billion). After further work brought WNP-4 to 24% completion and WNP-5 to 16% completion, the two units were cancelled; *see* 10 ENERGY USERS REP. (BNA) 897-98 (Sept. 2, 1982); Olsen, *The Washington Public Power Supply System: The Story So Far*, PUB. UTIL. FORT., June 10, 1982, at 15.

A different conclusion has been reached in an analysis of the ongoing construction of the Shoreham Nuclear Generating Station; *see* Wold, *How the Shoreham Reactor's Costs Soared*, N.Y. Times, Dec. 16, 1980, at B2, cols. 4-6. With the facility 85% complete, and with $1.7 billion of the plant's estimated $2.2 billion cost already spent, it was recommended that completion not be delayed pending investigation of an intervenor's claimed "conservation" alternative. *See* Proceeding to Investigate the Cost of the Shoreham Nuclear Generating Facility, NYPSC Opinion No. 27563, at 10 (Levy, A.L.J., 1981).

85. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 1 N.R.C. 347 (1975); *see, e.g.*, EBBIN & KASPER, *supra* note 15, at 58-90.

of public hearings before a licensing board which, in 1977, concluded that the proposed plant would be needed in 1984.[86] The state proceeding ran simultaneously; it consumed fifty hearing days, produced an 8,000 page transcript with 172 documentary exhibits, and culminated in a determination that the proposed plant was not needed at all.[87] A less effective regulatory effort does not readily come to mind.

B. *The Reasons for the Failure of the Basic Approach—The Industry's View*

Why has the current approach been such a failure? In the industry's view, the paradox presented by the need for further expansion in the face of excess capacity can be explained as an element of the "Energy Crisis." Existing capacity, much of it oil-fired, was planned before the Arab oil embargo and price shocks of 1973-1974. This extraordinary event caused energy consumption levels to fall well below those previously forecast, creating a temporary condition of excess capacity. At the same time, however, it demonstrated the importance of reducing the nation's dependence upon imported oil; a goal which could be reached by building new nuclear and coal-fired power plants.

The principal problem with this explanation is that it mis-

86. *In re* Rochester Gas & Elec. Corp. (Sterling Power Project, Nuclear Unit No. 1), 6 N.R.C. 350 (1977).

87. *In re* Rochester Gas & Elec. Corp. (Sterling Nuclear Power Plant), N.Y. Bd. on Elec. Generating Siting & the Env't Case No. 80005 (Feb. 11, 1980) [hereinafter N.Y. Bd. on Elec. GS-E]. Nightmares like the Sterling proceedings are not unique. In 1978, an NRC licensing board issued a permit for the construction of a two unit nuclear facility at Jamesport, N.Y., based on its finding that 2,300 Mw of new capacity would be needed by the middle to late 1980s. Two years later a New York siting agency nullified the NRC construction permit and licensed an 800 Mw coal- fired facility instead, concluding that available capacity would be adequate until at least the early 1990s. *Compare In re* Long Island Lighting Co. (Jamesport Nuclear Power Station, Units 1 and 2), 7 N.R.C. 826-77 (1978) *with In re* Long Island Lighting Co., N.Y. Bd. on Elec. GS-E Case No. 80003 (Sept. 8, 1980). *See also* South Dakota Pub. Util. Comm'n v. FERC, 690 F.2d 674 (8th Cir. 1982) (proceeding to allocate costs arising from the cancellation of a nuclear power plant which the NRC licensed in December 1977 but which, fifteen months later, the Wisconsin PUC found would not be needed).

The monetary costs of the process are difficult to calculate. The NRC staff has estimated that the direct costs to just the NRC and the applicant-utility for consideration of the "need for power" issue in NRC licensing proceedings ranged from $96,000 to $130,000 per application. *See* NUCLEAR REGULATORY COMM'N, PRELIMINARY STATEMENT ON GENERAL POLICY FOR RULEMAKING TO IMPROVE NUCLEAR POWER PLANT LICENSING (1978).

states history. The growth rate of power utilization in many regions had begun to decline even before the 1973-1974 embargo,[88] responding to a rise in the price of electricity which started in the late 1960s.[89] Utility planners were slow to perceive these changes, primarily because their forecasts of future energy requirements were made by a process of historical extrapolation[90]—essentially the simple extension of a straight line drawn through historical demand values plotted on a piece of log paper for as far into the future as a forecaster wanted to "see." At the time, there seemed to be ample justification for this methodology. For decades demand had grown steadily at an annual rate of about 7%, doubling every ten years, and it was commonly assumed that this trend would continue.[91] The deceleration in growth which began in the early 1970s was thus perceived, perhaps not unreasonably, as a temporary perturbation brought about by "abnormally mild weather" or a "business recession," rather than as a change in the long-term trend.[92]

Unfortunately, this misperception lingered for far too long. Even after the "crisis" atmosphere of 1973-1974 triggered dramatic declines in energy consumption—three successive years of about 2% growth—the industry's forecasters continued to anticipate a return to historical growth rates, apparently unable to comprehend slower growth as anything other than a short-term response to an emergency.[93] Indeed, if the embargo was to have any lasting effects, in the industry's view, these would include a marked *increase* in the demand for electricity relative to other energy

88. *See, e.g.*, Chapman, Tyrell & Mount, *Electricity Demand Growth and the Energy Crisis*, 178 SCI. 703 (1972); 1 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC CORPORATIONS 1 (1973).

89. *See generally* Chapman, *Electricity Demand and Utility Capacity Planning*, in CORNELL UNIV. DEP'T OF AGRIC. ECON. STAFF PAPER No. 73-17 (1973); Mount & Chapman, *Electricity Demand Projections and Utility Capital Requirements*, in CORNELL UNIV. DEP'T OF AGRIC. ECON. STAFF PAPER No. 74-24 (1974) (presented at the Conf. on Energy Investment Requirements, Brookings Institute, Washington, D.C., Sept. 5, 1974).

90. *See, e.g.*, 1 NEW YORK POWER POOL, REPORT OF MEMBER ELECTRIC CORPORATIONS intro. 1 (1973); *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046, 1081-82 (1974), *aff'd*, 1 N.R.C. 347 (1975).

91. *See, e.g.*, FEDERAL POWER COMM'N, THE NATIONAL POWER SURVEY (1970); ATOMIC ENERGY COMM'N, NUCLEAR POWER 1973-2000 (1972).

92. *See, e.g.*, *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. at 1066-67.

93. *See generally* ENVIRONMENTAL ACTION FOUND., POWER LINE (Nov. 1978).

sources.[94] Later, when the predicted return to historical growth rates failed to materialize, it became convenient to blame everything on OPEC. It is apparent, however, that OPEC's action only accelerated a trend which had begun much earlier.

C. *The Reasons for the Failure of the Basic Approach—Another View*

If OPEC is not to blame, who is? While the industry may have clung too long to outmoded projections of growth, why weren't the regulators more prescient? Why didn't they refuse to approve the capacity expansion which has proven so costly? An answer to these questions requires a closer look at the regulatory process.

First, the regulators never paused to develop criteria for determining whether there was a *social* need for new generating capacity.[95] Instead, they uncritically adopted the criteria for capacity planning which had been used by the utilities; the latter, taking continuous growth as axiomatic, readily derived the corollary that the demand for electricity should always be met.[96] This was, of course, a classic *non sequitur*; even if new demand had to be met—itself a dubious proposition[97]—it did not have to be met with central station capacity.

Unfortunately, this facile equation of "demand" with "need" led at once to the conclusion that public regulation of capacity expansion involved nothing more than the evaluation of a utility's demand forecasts.[98] While various citizens' groups continued to challenge proposed power plants on the grounds that growing demand could be met more economically and at less risk to public health, safety and the environment by a variety of conservation

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94. *See* NATIONAL ELEC. RELIABILITY COUNCIL, SEVENTH ANNUAL REVIEW OF OVERALL RELIABILITY AND ADEQUACY OF THE NORTH AMERICAN BULK POWER SYSTEMS (1977).

95. *See generally* McKim, *Social and Environmental Values in Power Plant Licensing: A Study in the Regulation of Nuclear Power*, and Goodpaster & Sayre, *An Ethical Analysis of Power Company Decision Making*, in VALUES IN THE ELECTRIC POWER INDUSTRY 30, 238 (K. Sayre ed. 1977).

96. *See generally* Novick, *supra* note 5; Maher, *The Dynamics of Growth In the Electric Power Industry*, in VALUES IN THE ELECTRIC POWER INDUSTRY 149 (K. Sayre ed. 1977); Goodpaster & Sayre, *supra* note 95.

97. *See* Murdock, *Legal and Economic Aspects of the Electric Utility's 'Mandate to Serve,'* in VALUES IN THE ELECTRIC POWER INDUSTRY 100 (K. Sayre ed. 1977).

98. *See, e.g., Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Power Station), 7 A.E.C. 159, 173 (1974) ("In other words, given the structure of our existing society the alternative of not meeting real demand is unthinkable").

measures, load management techniques, and on-site energy sources, these contentions were simply brushed aside by the regulators.[99] As they saw it, with their field of vision conveniently narrowed by the assumption that "demand" and "need" were synonymous, the implementation of these alternatives to central station expansion, however desirable, was simply not their responsibility. Few acknowledged this view outright.[100] Usually, considerable enthusiasm was expressed for the potential role of alternative energy sources, but in the concrete setting provided by a proceeding to license a specific increment of generating capacity, it was invariably concluded that this potential was just too "remote"; either the "feasibility" of the alternatives had not been adequately demonstrated, or their impact upon distant demand was "too difficult to quantify."[101] As a result of this rather passive regulatory response, the implementation of alternatives to central station generation was left to the marketplace or to other government initiatives.[102]

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99. For representative decisions of the various federal and state agencies, see *In re* Public Serv. Co. of New Hampshire (Seabrook Station, Units 1 and 2), 3 N.R.C. 857 (1976), *aff'd*, 6 N.R.C. 33 (1977); *In re* Rochester Gas and Elec. Corp. (Sterling Power Project Nuclear Unit No. 1), 6 N.R.C. 350 (1977); *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046 (1974), *aff'd*, 1 N.R.C. 347 (1975); *In re* Appalachian Power Co., 5 PUR 4th 334, 346-47 (1974), *aff'd sub nom.* North Carolina v. Federal Power Comm'n, 533 F.2d 702 (D.C. Cir.), *vacated and remanded*, 429 U.S. 891 (1976); *In re* Rochester Gas & Elec. Corp., N.Y. Bd. on Elec. GS-E Case No. 80005 (Feb. 11, 1980). *See also* McKim, *supra* note 95.

100. One notable exception was a decision of the New York PSC refusing to broaden an investigation of the comparative costs of coal-fired and nuclear-fired capacity to include a study of the costs of conservation and on-site alternative energy sources. While the PSC acknowledged that the proposed study was clearly important to the formulation of energy policy for New York State and the entire nation, it excused itself with the observation that:

> [o]ur function is merely to see that the prices of electric power reflect cost. . . . It is not our function, in a consumer-sovereign economy, to go beyond that point and consider the alternative of somehow artificially moderating those demands even further, or planning for a smaller increment to capacity on the ground that the result would otherwise be [too costly].

Costs of Nuclear and Fossil Fueled Facilities, 16 Op. NYPSC 144 (1976). *See also* ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 108 (quoting FPC staff member who declared that "planning for efficiency in power use was 'not our job' ").

101. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046, 1059-65, 1079-81 (1974), *aff'd*, 1 N.R.C. 347, 367-68

102. Reliance upon market forces for the allocation of capacity resources was particularly misplaced. Since electricity is sold at prices which are below the marginal costs of its production, the demand for electricity is "to high" (i.e., more than "optimal"). Allowing consumer demand to measure the need for generating capacity thus assures that "too much" capacity will be built. These pricing practices—which include the sale of electric energy at prices that decline as consumption increases ("declining block rates"), that fail to reflect the

Second, the regulators' failure to distinguish between "need"

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different costs of on-peak and off-peak consumption ("time unrelated rates"), and which are calculated on the basis of historic (average) plant costs—have come under intense criticism from economists. *See generally* Mitchell, Manning Jr., & Acton, PEAK LOAD PRICING (1978). Congress required in 1978 that all state regulatory commissions at least "consider" their elimination. *See* Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, §§ 111, 112, 115, 92 Stat. 3117, 3121-23, 3125-28 (codified at 16 U.S.C. §§ 2621, 2622, 2625 (Supp V 1981)). Some PUCs had acted prior to the federal initiative. *See* Brancato, *New Approaches to Current Problems in Electric Utility Rate Design*, 2 COLUM. J. ENVTL. L. 40 (1975); *In re* Electric Rate Design, 16 Op. NYPSC 671 (1976), *reh'g denied*, (Oct. 18, 1976) (concluding that marginal cost pricing provided a reasonable basis for the design of electric rate structures). *See also* New York State Council of Retail Merchants v. PSC, 45 N.Y.2d 661, 348 N.E.2d 1282, 412 N.Y.S.2d 358 (1978) (upholding this regulatory initiative). Of course, it will take years for cost-based tariffs to be fully implemented. *See* C. Cicchetti, *Wisconsin's Approach to Public Utility Regulation*, in ENERGY AND COMMUNICATIONS IN TRANSITION 489-99 (1981) (rate reform bogged down in methodological debate).

Even *after* rate reform is accomplished, reliance upon the marketplace to allocate efficiently capacity resources will remain misplaced because market imperfections lead the real-world consumer to demand "too much" electricity even when he receives the "right" price signal. In some cases, consumer ignorance is responsible; for example, a consumer may buy an air conditioner which costs less to purchase but more to operate than another, simply because he is unaware of the "life-cycle" costs of the appliance. In perhaps far more cases, ignorance is not the explanation; thus, even if the life-cycle costs of both air conditioners are known, the real-world consumer might still purchase the "wrong" one because future savings are not as important to him as present ones. Unfortunately, the typical energy supply investment is one with relatively high initial costs. One major urban utility has estimated that a conservation package for a "typical" residential customer might cost about $2,650 and pay for itself in about seven years. *See Fuel Saving Ideas in Con Ed Display*, N.Y. Times, Nov. 15, 1979, at C5, col. 2. Another study has concluded that on Long Island, an average investment of $2,200 per household would not be recovered for eight years. *See Long Island Study Finds Solar Power Saves Most*, N.Y. Times, Nov. 15, 1979, at D15, col. 4. The staff of the New York PSC has estimated the payback periods for wall insulation, storm windows and clock thermostats to range from five and one-half to seven years, seven and one-half years to ten years, and four and one-half to nine years, respectively. *See In re* Request of Senator Pisani with Respect to the Home Insulation Act of 1976, NYPSC Opinion No. 27064, at 15-16 (Matias, A.L.J. July 15, 1977).

This tendency of real-world consumers to "discount" future savings presents a significant obstacle to the achievement of energy efficiency through the marketplace. Some studies have concluded that the operative payback period for many consumers is as short as two years. *See* ENERGY FUTURE, *supra* note 3, at 308 n.42. Although the prevalence of so stringent an investment criterion (the equivalent of a 50% return) may seem dubious, legislative measures designed to stimulate consumer investment in energy conservation—but built around more modest assumptions—all have had relatively little success. For example, the Energy Tax Act of 1978, Pub. L. No. 95-618, § 101, 92 Stat. 3174, 3175-80 (codified at 26 U.S.C. § 44C (1978)), effective April 19, 1977, made available a federal income tax credit (up to $300) of 15% of the cost of various residential energy conservation measures such as insulation, caulking, storm windows, clock thermostats, etc., and an additional credit (up to $2,200) for 30% of the first $2,000 and 20% of the next $8,000 invested in a "renewable energy source" such as wind generators or solar energy systems. According to the Internal Revenue Service, by the end of 1978 these provisions had prompted an investment of $3.6

and "demand" was compounded by their readiness to rely upon the industry's demand forecasts. Long after these forecasts should have been recognized as self-serving fantasy, they continued to be rubber-stamped in the regulatory arena.[103] The results were embarrassing. In some cases a utility would no sooner obtain a construction permit on the basis of forecast capacity deficiencies than it would "revise" its projections and announce a "deferred" in-service date for the same unit.[104] Where construction schedules were

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billion in energy conservation measures and $116 million in renewable energy sources. *See Defining the Deductions on Passive Solar Units*, N.Y. Times, Oct. 16, 1980, at C7, col. 1. This is a relatively modest sum when compared to the $220 billion of capital investment in conservation which has been estimated to be cost-effective at just current energy costs. *See* ENERGY FUTURE, *supra* note 3, at 308 n.95. Expressing the view that "a much stronger response must be stimulated," Congress recently increased the federal credit available for "renewable energy source" expenditures to 40% of the first $10,000. *See* Crude Oil Windfall Profits Tax Act of 1980, Pub. L. No. 96-223, § 202, 94 Stat. 229 (codified at 26 U.S.C. 44C(b)(2), (c)(2)(B) & (D) & (c)(5)(A)(i) (Supp. V 1981)).

Consumer investment in low-cost residential energy conservation financing programs has also been minimal. New York, for example, has required since 1977 that the state's investor-owned utilities offer residential consumers a $10 energy audit and, if requested, to arrange for the financing of qualifying conservation investments—i.e., those with an estimated payback period of less than seven years—at an interest cost equal to the company's last allowed rate of return (which has been in the range of 9%-10%). *See* Home Insulation and Energy Conservation Act of 1977, N.Y. PUB. SERV. LAWS §§ 135a-n (McKinney Supp. 1982). In the first two years of operation, program results were minimal; the utilities conducted 16,000 audits, which generated 698 loans involving a total of $1,119,507. *See* NEW YORK PUB. SERV. COMM'N, SECOND ANNUAL REPORT ON IMPLEMENTATION OF THE NEW YORK STATE HOME INSULATION AND ENERGY CONSERVATION ACT 12 (1980). Similar results have been experienced elsewhere. *See Rural Heating Aid is Termed a Failure*, N.Y. Times, Dec. 9, 1979, at A63, col. 1 (reporting that a United States Department of Agriculture financing program, designed to provide $1 billion for the insulation of four million homes has produced in three years loans totaling less than $1 million to about 1,000 households). For a more optimistic view of the future of residential energy conservation programs than their history would seem to warrant, see Finelea & Treiber, *Residential Energy Conservation Measures: A Penny Saved Is A Penny Earned*, 11 ENVTL. L. 639 (1981).

103. For representative decisions, see, *e.g.*, *In re* Rochester Gas And Elec. Corp. (Sterling Power Project, Nuclear Unit No. 1), 6 N.R.C. 350 (1977); *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 1 N.R.C. 347 (1975); *In re* Rochester Gas And Elec. Corp., N.Y. Bd. on Elec. GS-E Case No. 80005 (Jan. 11, 1978). *See generally* McKim, *supra* note 95.

104. The history of a New York nuclear power unit now under construction by the Niagara Mohawk Corp. is illustrative. The company applied for a permit in June 1972, forecasting capacity deficiencies that required installation of the plant no later than December 1978. Opponents of the plant contended that the facility would not be needed before the mid-1980s, at the earliest. The issue was litigated vigorously. In April 1975, the NRC appeal board concluded that the utility's "forecasts" (a euphemism for a straightforward historical extrapolation) were "reasonable," and licensed construction. *See In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit No. 2), 1 N.R.C. 347 (1975). Just *two*

not "stretched out" in this manner, it later became evident that construction had begun prematurely—adding hundreds of millions of dollars in unnecessary interest charges to the eventual cost of a facility.[105]

D. *Governmental Forecasting—An Unpromising Change in the Basic Approach*

Not surprisingly, the waste of such enormous sums has provoked considerable concern, prompting efforts by many state regulators to develop an independent forecasting capability.[106] Unfortunately, while reduced reliance on industry forecasts is undoubtedly a step in the right direction,[107] it is a smaller one than is commonly assumed. To be sure, "historical extrapolation" is a forecasting methodology which has outlived its usefulness, and capacity planning can be improved by the use of modern econometric and engineering techniques which increase our ability to anticipate the impact of changing economic, social, and technological conditions.[108] At the same time, it is too easy to be overly impressed by the dazzling array of quantitative methods now being employed in

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months later, the licensee announced that it was selling 59% of its interest in the plant to a group of other companies. The scheduled in-service date for the plant was subsequently "slipped"—first to 1982, then to 1984, and then to 1986. This case is not unique. A member of the NRC has conceded that his agency's "need determinations have been wrong at least as often as they have been right." *See* Bradford, *Lightening the Nuclear Sled: Some Uses and Misuses of the Three Mile Island Accident*, Remarks before Seminar on Energy Policy at N.Y. Univ. on Nov. 21, 1979, *reprinted in* 5 NRC NEWS RELEASE 44 (Dec. 6, 1979).

105. For example, more than $750 million already had been invested in the Nine Mile Point nuclear unit when, in 1980, its sponsors announced that the in-service date of the plant (licensed in 1974 for service in 1980) was being deferred until at least 1986. Carrying charges on this investment continue to accrue and will add hundreds of millions of dollars to the cost of the plant, now projected to rise above $4 billion. *See* Financial and Cost Implications of Constructing the Nine Mile Point No. 2 Nuclear Station, NYPSC Opinion No. 82-7, (Apr. 16, 1982).

106. According to the General Accounting Office, of the forty-one states which responded to its survey, nineteen had begun to develop either independent forecasts or analyses to test the reasonableness of their utilities' projections. *See* ELECTRICITY PLANNING, *supra* note 77, at 21.

107. Governmental demand forecasts generally have been lower than those of the utilities; indeed, in only two of the nineteen state forecasts surveyed by the General Accounting Office were the results even "close" to utility forecasts. *Id.* In a few instances these lower governmental forecasts have led to disapproval of utility planned expansion. *Id.* at 22-23.

108. Econometric and engineering (or "end use") analyses are the two forecasting methodologies which currently "share the spotlight." *Id.* at 17-18. *See generally* ENERGY FUTURE, *supra* note 3, at 234-67.

place of yesterday's straight-line extrapolations. Quite simply, long-range projections of the demand for electricity are indeterminate,[109] and there is no reasonably objective basis available for selecting among even widely divergent forecasts.

Consider, for example, that while the Edison Electric Institute recently forecast a 4.3% annual average load growth rate for the next decade, the Department of Energy estimated a growth rate of only 2.1%. [110] Both forecasts were produced by "state-of-the-art" computer models, and it is not apparent that one model is any "better" or more "sophisticated" than the other. The problem, of course, is that each model incorporates different (yet, given the uncertainties, equally "reasonable") assumptions about the factors which influence the demand for electricity. These factors include the price of oil, the availability of coal, the gross national product, the cost of pollution controls, etc. Exacerbating this problem of which variables to include in any growth model is the fact that accurate forecasts of these variables remain well beyond the compass of computers.[111] Then, too, forecasts do not consider the possibility of technological developments within the fifteen year planning period, such as the electric car, which could have a major impact upon electricity consumption patterns.[112] Realistically, the

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109. *See, e.g.*, LANDSBERG, ENERGY: THE NEXT TWENTY YEARS, 91-113 (1980); SCHURR, ENERGY IN AMERICA'S FUTURE: THE CHOICES BEFORE US 204-17 (1980).

110. *See generally* DEPARTMENT OF ENERGY, ELECTRIC POWER SUPPLY AND DEMAND FOR THE CONTIGUOUS UNITED STATES 1980-1989 (July 1980).

111. *See generally* ENERGY FUTURE, *supra* note 3, at 234-67. In a recent New York power plant certification proceeding, *eleven* different long-range (fifteen year) demand forecasts were examined. The highest (32,465 Mw) was referred to as the utility "business as usual" forecasts, and the lowest (21,831 Mw) was a consumer-environmentalist sponsored "pessimistic" forecast. The difference betwen the two forecasts—more than 10,000 Mw—represented capital costs of more than $10 *billion*. Despite the size of this gulf, the siting board found "[n]either forecast . . . given its assumptions, demonstrably wrong or inaccurate." *See In re* Rochester Gas and Elec. Corp. (Sterling Nuclear Power Plant), N.Y. Bd. on Elec. GS-E Case No. 80005, at 6 (Feb. 11, 1980). *See also In re* Kansas Gas & Elec. Co. (Wolf Creek Generating Station, Unit 1), 7 N.R.C. 320 (1978), where the applicant's econometric model forecast 1982 as the required in-service date for the plant while an intervenor's econometric model forecast 1990. Unable to find any basis for choosing one forecast over the other, the NRC selected the applicant's forecast, observing: "Whether eventually proven right or wrong, that prediction stood on at least equal footing with . . . [the intervenor's]." *Id.* at 333.

112. According to Alvin Weinberg, former director of the Oak Ridge National Laboratory, "[t]wo technical developments, the electric car and the heat pump, could swing the balance toward an electrical future dominated by large central stations." *See* ENERGY USERS REP. (BNA) No. 330, at 16-17 (Dec. 6, 1979). *See also* DEPARTMENT OF ENERGY, INFORMATION

development of a long-range demand forecast as a basis for capacity planning turns more upon faith than upon science.

Under these circumstances, it should come as no surprise to discover that the decision-making process is more conciliatory than analytical. In a typical case, both "high" and "low" forecasts will be rejected in favor of some "mid-range" projection which, for that reason alone, will be characterized as "reasonable."[113] For example, when a government agency is confronted by a utility prediction of annual growth of 5.5% and a competing forecast of 4.5%, the allure of a 5% figure can be compelling.[114] Nevertheless, the costs of even such a seemingly small compromise can be extraordinary. In New York, every .1% increase in the load-growth rate adds 400 Mw to the fifteen year forecast of capacity requirements.[115] For the nation, the figures are staggering. The General Accounting Office has estimated that the cost of meeting the industry's forecast capacity requirements for only the next decade approaches $333 billion, but that a 1% lower growth rate (about *half* the difference between the current forecasts of the industry and the government) would obviate the need for 75,000 Mw of capacity, saving $108 *billion*.[116] Costs of this magnitude would seem to exceed any socially tolerable margin of error and, accordingly, an approach to capacity planning which continues to rely upon the selection of a long range demand forecast (even where an "independent" governmental forecast is among the available array) would seem to be unacceptable.

The development by the regulators of an independent demand capability seems also to have come too late. Today the industry's expansion plans are no longer derived simply from demand projections. Because predicted growth failed to materialize for the past ten years, the industry has begun to emphasize new reasons for continuing to build new power plants. The claim is now commonly made that new coal or nuclear capacity is required—whether de-

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No. 3, at 26 (June 22, 1979) (announcing the development of a four-passenger, subcompact experimental electric car designed to be mass-produced economically by 1985).

113. *See In re* Long Island Lighting Co. (Jamesport Nuclear Power Station), N.Y. Bd. on Elec. GS-E Case No. 80003, at 9 (Sept. 8, 1980); *In re* Rochester Gas and Elec. Corp. (Sterling Nuclear Power Plant), N.Y. Bd. on Elec. GS-E Case No. 80005, at 7; *In re* Rochester Gas and Elec. Co. (Sterling Power Project Nuclear Unit No. 1), 6 N.R.C. 350, 374-99 (1977).

114. *See In re* Niagara Mohawk Corp., 17 Op. NYPSC 1056 (1977).

115. *See* STATE ENERGY PLANNING PROCEEDINGS, *supra* note 26, at 33-35.

116. ELECTRICITY PLANNING, *supra* note 77, at 15-16.

mand grows or not—as an "economic substitute" for expensive oil-fired generation.[117] In addition, the industry contends that the construction of new coal and nuclear facilities should be viewed as an important part of the nation's pursuit of "energy independence," since each new 1,000 Mw power plant can produce the annual energy equivalent of about ten million barrels of foreign oil.[118]

In some instances this shift to new criteria for capacity planning has been particularly dramatic. For example, in 1979 the New York Power Pool declared that the "paramount consideration" in developing its generation expansion plan was a reduction in its dependence on foreign petroleum resources.[119] More often, however, the new planning criteria are employed with subtlety. New capacity is still said to be justified primarily by projected growth in demand, but utilities also argue that the new "need" theories justify an "early" addition of the new plant—that is, an in-service date in advance of forecast capacity deficiencies.[120] This use of the new "need" theories masks their true significance; while they appear merely to *supplement* a traditional "need" case, in reality they are *dispositive*. Since long-range demand forecasts are indeterminate, "need" findings will turn on the burden of proof (i.e., on a selection of the preferred direction of error).[121] Acceptance of the new "need" contentions thus has the effect of allocating that burden to the opponents of the proposed expansion. If "early" capacity additions are *always* to be preferred over "late" ones, then the appro-

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117. *See, e.g.*, Parisi, *Talking Business with Leland F. Sillin, Jr. of Northeast Utilities*, N.Y. Times, Nov. 22, 1979, at D3, col. 1 ("Even if we had no load growth, we should be putting on nuclear reactors anyway because of the economics"); *In re* Commonwealth Edison Co., NUCLEAR REG. REP. (CCH) ¶ 20, 168 (Ill. Commerce Comm'n, Oct. 15, 1980) (completion of nuclear unit justified even in the case of zero load growth).

118. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point, Unit 2), 7 A.E.C. 1046, 1068 (1974), *aff'd*, 1 N.R.C. 347 (1975). *See also Another Setback for Seabrook*, N.Y. Times, Nov. 18, 1979, at F19, col. 3 (noting the claim by Public Service Co. of New Hampshire that its Seabrook nuclear station was "necessary" in order to make a "major dent" in New Hampshire's dependence on Middle Eastern oil).

119. 1 NEW YORK POWER POOL, REPORT OF THE MEMBER SYSTEMS 9 (1979).

120. *See, e.g.*, New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87 (1st Cir. 1978) (capacity deficiencies forecast for 1985, but unit planned for service in 1981); *In re* Niagara Mohawk Power Corp. (Lake Erie Generating Station), N.Y. Bd. on Elec. GS-E Case No. 80007 (Apr. 23, 1980); *In re* Rochester Gas and Elec. Co. (Stering Nuclear Power Plant), N.Y. Bd. on Elec. GS-E Case No. 80005 (Feb. 11, 1980).

121. *Cf.* International Harvester Co. v. Ruckelshaus, 478 F.2d 615, 642-43 (D.C. Cir. 1973) ("crystal ball" not required, but predictor must "make a showing of reliability of the methodology of prediction . . .").

priate response to uncertainty concerning demand is *always* to issue the contested license. Resolution of the differences in competing demand forecasts thus becomes unnecessary.[122]

E. *The New "Need" Theories*

There is perhaps some merit in the new "need" theories, but just how much is difficult to say. Calculations of the comparative economics of different generating modes are quite complex.[123] For example, even assuming that the relative prices of oil, coal, and uranium make a new coal or nuclear plant cheaper to operate than an existing oil-fired facility, rising capital costs have left unclear whether the operation cost savings over the life of the new plant will be sufficient to offset the fixed charges of its construction.[124] Such calculations are highly sensitive to assumptions about a large number of factors including the future course of construction costs, power plant performance, fuel prices, health and safety regulation, and inflation.[125] Whether electricity from a coal or nuclear unit planned today for future service will be more or less expensive than oil-fired generation from existing plants is thus a question which invites at least as much guesswork as a long-range demand forecast.

Of course, the economics of energy from alternative sources deserves to be considered as well. Surely it makes no sense to replace oil-fired generators with coal or nuclear units if the same objective can be accomplished more cheaply and more quickly by the conversion of existing oil-fired boilers to coal,[126] by the more effi-

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122. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046, 1083-84 (June 14, 1974) (benefits of nuclear-for-fossil fuel substitutions make it "unnecessary" to determine a "year of need" for a proposed nuclear power plant), *aff'd on other grounds*, 1 N.R.C. 347 (1975).

123. *See generally* DEPARTMENT OF ENERGY, PROJECTED COSTS OF ELECTRICITY FROM NUCLEAR AND COAL-FIRED POWER PLANTS (Aug. 1982); *In re* Motion of Commission as to the Comparative Economics of Nuclear and Fossil Generating Facilities, NYPSC Opinion No. 26974 (Reed, A.L.J., Dec. 18, 1978).

124. *See, e.g., In re* Long Island Lighting Co. (Jamesport Nuclear Power Station), N.Y. Bd. on Elec. GS-E Case No. 80003 (Sept. 8, 1980).

125. *See generally In re* Motion of Comm'n as to the Comparative Economics of Nuclear and Fossil Fueled Generating Facilities, NYPSC Opinion No. 26974 (Reed, A.L.J., Dec. 18, 1978); *In re* Long Range Electric Plans, NYPSC Opinion No. 78-3 at 19-22 (Mar. 6, 1978).

126. *See generally* GENERAL ACCOUNTING OFFICE, FINANCIAL AND REGULATORY ASPECTS OF CONVERTING OIL-FIRED UTILITY BOILERS TO COAL (1980) (concluding that coal conversion

cient utilization of existing facilities,[127] by the development of renewable energy sources such as geothermal steam, solar, wind, or low-head hydro,[128] or by some combination of these strategies and others. The construction of new nuclear or coal-fired electric generating stations is just one of many possible reactions to the current dependence upon foreign oil. Whether it is a prudent response can be determined only by a careful, balanced consideration of the full array of energy supply options, not by the talismanic incantation of shibboleths such as "fuel substitution" and "energy independence."[129]

The industry's current claims for continued central station capacity expansion thus deserve close scrutiny. Unfortunately, in the first case to reach the courts, these claims received less than rigorous review.[130] In its 1973 application to the NRC for a permit to construct the Seabrook, New Hampshire, nuclear power station, the Public Service Company of New Hampshire (PSCo.) contended that the plant was needed to meet forecast capacity deficiencies beginning in 1981.[131] An NRC licensing board agreed, but the appeal board rejected this finding as establishing a need for the plant before 1985 because the licensing board had failed to allow full cross-examination of certain testimony bearing on the utility's demand projections for the period 1981-1985.[132] Nevertheless, the appeal board determined that there was a "need" for the Seabrook facility during this earlier period because it concluded that the

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should be favored over new construction in most cases).

127. According to recent studies, U.S. energy imports could be *totally* displaced within ten years by conservation measures available in the building and transportation sectors. C. FLAVIN, ENERGY AND ARCHITECTURE: THE SOLAR AND CONSERVATION POTENTIAL (1980).

128. Yergin, *Conservation: The Key Energy Source*, in ENERGY FUTURE, *supra* note 3, at 136-82; Maidique, *Solar America*, in ENERGY FUTURE, *supra* note 3, at 183-215.

129. California utilities, at the urging of the California PUC, may be developing a more rational "oil blackout" investment strategy—one where the investment "promising the highest payoff should have first call on society's resources." *See* ENERGY CONSERVATION AND PUBLIC POLICY (Sawhill ed. 1979). Two California companies are reportedly now planning significant increments of nonconventional new capacity instead of coal fired generation. *See California Utilities Reassess Role in Allen-Warner Electricity Project*, ENERGY USERS REPORT (BNA) No. 393, at 321 (Feb. 19, 1981).

130. *See* New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87, 96-98 (1st Cir. 1978).

131. *In re* Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), 3 N.R.C. 857, 902 (1976).

132. *In re* Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), 6 N.R.C. 33, 90-95 (1977).

plant could generate electricity more "economically" than PSCo.'s existing oil-fired capacity.[133]

Opponents of the plant challenged this conclusion, contending that it was flawed by the board's failure to take capital costs into account in calculating the cost of power generation. The simple theory of this challenge appears sound: The construction of a new power plant four years before its capacity might otherwise be required by reliability considerations imposes additional capital charges on its owner; whether such construction (and the retirement of an existing facility) is "economical" requires a comparison of these charges with any operation cost savings which might accrue.[134] A calculation which ignores these capital charges is thus meaningless, and any licensing action predicated upon such a calculation should be set aside as arbitrary and capricious. For some reason, the First Circuit Court of Appeals disagreed, observing: "We do not think it would be unreasonable to base the cost comparison on operation costs given that the need for the additional power, and thus the need to construct a plant, at some point in the future had already been established."[135]

Just what this means is not easy to say. Since "the need for additional power . . . at some point in the future" can *always* be established (it is the forecast *rate* of growth, not growth itself, which invites disagreement), the decision can be interpreted to provide approval for the early construction of new power plants in *all* cases (since their operating costs are invariably lower than those of older units). In addition, it would seem the earlier the construction commences the better, for further operating cost savings will accrue every year.

On the other hand, a far narrower ruling is suggested by the court's additional observation: "But in the alternative the Board stated that the nuclear plant would be a preferable substitute even if construction costs were considered."[136] The court thus may simply have held that the appeal board calculations had not, *in fact*, been made as the petitioners claimed. While this reading of the

133. *Id.* at 95-98.

134. *See, e.g., In re* Long Island Lighting Co. (Jamesport Nuclear Power Station), N.Y. Bd. on Elec. GS-E Case No. 80003 (Sept. 8, 1980).

135. New England Coalition on Nuclear Pollution v. NRC, 582 F.2d 87, 98 (1st Cir. 1978).

136. *Id.*

decision is less disturbing than the broader one, it is disturbing enough. At the very least, it reveals a judicial readiness to accept an administrative determination of comparative generating costs supported by little, if any, evidence. To be sure, the appeal board "stated" that its comparative cost calculation had taken capital costs into account, but this statement—an off-hand, one sentence reference to a "study" performed by PSCo.[137]—indicates that the board's consideration of the matter had been cursory at best. Such an analysis is certainly not the kind of "hard look" upon which reviewing courts often insist.[138]

On occasion, some state regulators have given the new utility "need" claims the scrutiny they deserve, even without judicial prodding. While acknowledging the conceptual validity of the "fuel substitution" theories, they have nevertheless insisted upon factual support for particular applications (which, as yet, has not been forthcoming).[139] Future decisions like these, however, are likely to be few and far between. The complexity of the issues, the mesmerizing influence of slogans, the growing unpopularity of regulation generally, and the judicial imprimatur in *Seabrook* all suggest that the new "need" claims of the utilities will be as readily rubberstamped as the old. Under the current approach, the regulation of capacity expansion thus promises to remain a very costly illusion.

III. Some Modest Reforms

The best regulation of electric utility capacity expansion in the long run will probably be no regulation at all. Since the generation of electricity is no longer characterized by economies of scale (i.e., declining costs for each additional unit of output),[140] the "nat-

137. *In re* Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), 6 N.R.C. 33, 97 (1977).

138. *See, e.g.*, Kleppe v. Sierra Club, 427 U.S. 390, 410 n.21 (1976). *See generally* Rodgers, *A Hard Look at Vermont Yankee: Environmental Law Under Close Scrutiny*, 67 Geo. L. J. 699, 701-08 (1979); Gellhorn, Byse, and Strauss, Adminstrative Law: Cases and Comments 343-50 (7th ed. 1979).

139. *See, e.g., In re* Long Island Lighting Co. (Jamesport Nuclear Power Station) N.Y. Bd. on Elec. GS-E Case No. 80003, at 10-19 (Sept. 8, 1980); *In re* Niagara Mohawk Power Corp. (Lake Erie Generating Station), N.Y. Bd. on Elec. GS-E Case No. 80007, at 11, 24-26 (Apr. 23, 1980); *In re* Rochester Gas and Elec. Co. (Sterling Nuclear Power Plant), N.Y. Bd. on Elec. GS-E Case No. 80005, at 10-15 (Feb. 11, 1980).

140. *See* Loose & Flaim, *supra* note 13; Jones, *supra* note 13, at 501.

ural monopoly" rationale for regulation no longer applies[141] and competition presumably can be relied upon for an efficient allocation of new capacity resources.[142] Still, no matter how desirable the deregulation of electric generation may be, it is not likely to be accomplished overnight.[143] In the meantime, mindful of John Maynard Keynes' dictum that "in the long run we are all dead,"[144] consideration should be given to less ambitious reforms.

A. *Restructuring Regulation*

1. *Federal regulation: History and prognosis.* At the federal level, responsibility for the regulation of electric utility capacity expansion fell upon the Atomic Energy Commission (AEC) quite by accident. Authorized in 1954 to license the construction and operation of nuclear power plants, the AEC initially was concerned only with the protection of radiological health and safety; other issues, such as the environmental or economic impact of a proposed power reactor, were beyond the Commission's purview.[145] This situation changed rather dramatically with the passage of the National Environmental Policy Act of 1969 (NEPA).[146] All federal agencies were suddenly instructed to give "appropriate consideration" to environmental values when exercising their statutory pow-

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141. *See, e.g.*, KAHN, *supra* note 9, at 119 ("The critical . . . characteristic of natural monopoly is an inherent tendency to decreasing unit costs . . .").

142. A variety of proposals for the deregulation of electric generation have already been made. *See* Pace & London, *Alternative Scenarios for Deregulating the Electric Utility Industry*, in ELECTRIC POWER: CURRENT ISSUES IN REGULATION AND FINANCING 755 (Allen ed. 1982); Note, *Efficiency and Competition in the Electric Power Industry*, 88 YALE L.J. 1511 (1979); B. Commoner, *supra* note 37.

143. While overnight success cannot be expected, a modest deregulation effort implemented by the Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, §§ 201-210, 92 Stat. 3141 (codified at 16 U.S.C. §§ 796, 824(a)(3) (Supp. IV 1980)), which requires electric utilities to purchase electricity from cogenerators and small power producers, was recently upheld by the Supreme Court. *See* American Elec. Power Serv. Corp. v. Federal Energy Reg. Comm'n, 675 F.2d 1226 (D.C. Cir.), *rev'd sub nom.* American Paper Inst. v. American Elec. Power Serv. Corp., 103 S. Ct. 1921 (1983) (FERC regulations implementing Public Utilities Regulatory Policies Act were not arbitrary, capricious, or an abuse of discretion).

144. OXFORD DICTIONARY OF QUOTATIONS 296 (3d ed. 1979).

145. *See* New Hampshire v. AEC, 406 F.2d 170 (1st Cir.), *cert. denied*, 395 U.S. 962 (1969) (consideration of possible thermal pollution from discharge of cooling water by nuclear power plant was beyond AEC's jurisdiction).

146. 42 U.S.C. §§ 4321-4361 (1976). As evidence of this dramatic shift, see Calvert Cliffs' Coordinating Comm. v. AEC, 449 F.2d 1109 (D.C. Cir. 1971).

ers.[147] In addition, because the licensing of even an individual nuclear power plant was held to be "major federal action significantly affecting the quality of the human environment,"[148] the AEC was required to file a "detailed statement"[149] which discussed the environmental impact of and alternatives to each proposed facility.[150] The standard environmental impact statement (EIS) filed by the AEC also included a chapter discussing the "need" for additional generating capacity on the applicant utility system.[151]

There was nothing in NEPA which explicitly required a cost-benefit analysis. Nevertheless, some courts had held that the Act authorized them to set aside as "arbitrary and capricious" any agency action which clearly failed to give sufficient weight to environmental values[152] and, in connection with this aspect of judicial review, these courts seemed to expect that the EIS would include a discussion of the benefits and costs of the proposed agency action.[153] Since the major benefit of a power plant was acknowledged to be the electricity it would produce,[154] if there was no demonstrable need for this electricity, the significant environmental costs of construction and operation of the plant would presumably tip the NEPA scales against it. The logic of this conclusion seemed ines-

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147. *See* 42 U.S.C. § 4332 (2)(B) (1976).

148. Izaak Walton League of America v. Schlesinger, 337 F. Supp. 287, 293 (D.D.C. 1971).

149. *Id.* at 293, (citing 42 U.S.C. § 4332 (1976)).

150. *Cf.* Morningside Renewal Council, Inc. v. AEC, 482 F.2d 234 (2d Cir. 1973) (upholding AEC determination that issuance of license to Columbia University to operate a small research reactor in New York City was not a major federal action requiring preparation of an EIS), *cert. denied*, 417 U.S. 951 (1974).

151. *See, e.g.*, ATOMIC ENERGY COMM'N, FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION OF NINE MILE POINT NUCLEAR STATION UNIT 2, No. 50-410 (June 1973). *See generally* McKim, *supra* note 95, at 59-60, 66-69.

152. *See Calvert Cliffs'*, 449 F.2d at 1115 ("The reviewing courts probably cannot reverse a substantive decision on its merits . . . unless it be shown that the actual balance of costs and benefits that was struck was arbitrary or clearly gave insufficient weight to environmental values"). Other courts have held that NEPA does not require an explicit benefit cost analysis, and the authorities remain split. *See generally* W. RODGERS, ENVIRONMENTAL LAW 744-47 (1977). The Council on Environmental Quality's regulations implementing NEPA appear to avoid the question. *See* 40 C.F.R. § 1502.23 (1982).

153. *Calvert Cliffs'*, 499 F.2d at 1114; United States v. Thompson, 463 F.2d 1258, 1262 (D.C. Cir. 1972); Weyerhaeuser Co. v. Castle, 590 F.2d 1011, 1051 n.65 (1978).

154. *See, e.g.*, FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION OF NINE MILE POINT NUCLEAR STATION, UNIT 2, *supra* note 151, at 10-11 (expected generation from plants its "primary benefit"); *In re* Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), 4 N.R.C. 397, 405 (1976) (expected generation from plant its "principal 'benefit' ").

capable, and it led the AEC to rule that "a determination that there is a 'genuine need for the electricity to be produced' is an essential element in approval of a license for a nuclear facility."[155] "Need for power," the AEC observed, was simply a "shorthand expression for the 'benefit' side of the cost-benefit balance which NEPA mandates for a proceeding considering the licensing of a nuclear power plant."[156]

Inseparable from this "cost-benefit balance" was a consideration of alternatives to the proposed action which could affect the balance to be struck. Section 102(2)(C)(iii) of the Act required the EIS to contain a detailed discussion of "alternatives to the proposed action,"[157] and emphasis was added by section 102(2)(D), which directed all federal agencies to "study, develop and describe appropriate alternatives to recommended courses of action."[158] Together, these requirements for a thorough discussion and study of alternatives were characterized as the "linchpin" of the decisional process envisioned by the Act,[159] a process which was described in the landmark *Calvert Cliffs' Coordinating Committee v. AEC* decision as having been designed

> to ensure that each agency decision maker has before him and takes into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance. Only in that fashion is it likely that the most intelligent, optimally beneficial decision will ultimately be made.[160]

While it may be doubted that "optimally beneficial" decision making by the bureaucracy was ever really anticipated, the courts have made it clear that it was an ideal for which the federal agencies were expected to strive.

In *National Resources Defense Council v. Morton*,[161] the District of Columbia Court of Appeals held that NEPA required an agency to include in its consideration of "alternatives" to a pro-

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155. *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 1 N.R.C. 347, 352 (1975).

156. *In re* Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), 6 N.R.C. 33, 90 (1975).

157. 42 U.S.C. § 4332(2)(C)(iii).

158. *Id.* § 4332(2)(E).

159. Monroe County Conservation Council, Inc. v. Volpe, 472 F.2d 693, 697-98 (2d Cir. 1972).

160. *Calvert Cliffs'*, 449 F.2d at 1114.

161. 458 F.2d 827 (D.C. Cir. 1972) [hereinafter cited as *NRDC v. Morton*].

posed action even some which were beyond the Agency's statutory power to implement. Thus, before the Secretary of Interior could sell offshore oil and gas leases, he was required to consider (and had to discuss in an EIS) such energy supply alternatives as the elimination of oil import quotas, modifications in natural gas pricing policies, the termination of state controls over domestic oil production and the accelerated development of nuclear power, even though the implementation of each of these "alternatives" was entirely beyond his jurisdiction. Observing that NEPA sought to avoid the piecemeal approach to environmental problems which so often was taken by agencies whose vision was narrowed by mission-oriented mandates, the court reasoned that if the Secretary of Interior could limit his consideration of alternatives to those within his existing authority, environmental policy would continue to be made "in small but steady increments."[162] In contrast, said the court, NEPA required a "comprehensive approach to environmental management."[163]

This broadly construed obligation to weigh the costs and benefits of alternatives to a proposed power reactor added an enormous new dimension to the AEC's licensing responsibilities.[164] An applicant for a construction permit invariably forecast a growing demand for electricity on its system and, on this basis, claimed that the proposed facility was "needed" to maintain adequate generating reserves. Plainly, this was an objective which could be met by a variety of alternatives, including so-called "energy conservation" measures and "on-site" energy sources which might eliminate or at least moderate growth in demand. Thus, the *Calvert Cliffs'* and *Morton* decisions quickly prompted the opponents of nuclear power to champion just such "alternatives" before the AEC.[165] After early resistance, the AEC grudgingly conceded that "the subject of energy conservation" could not be "altogether ruled out of licensing proceedings,"[166] and licensing interventions focusing on

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162. *Id.* at 836.

163. *Id.*

164. *See generally* Murphy, *The National Environmental Policy Act and the Licensing Process: Environmental Magna Carta or Agency Coup de Grace?*, 72 COLUM. L. REV. 963 (1972).

165. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046 (Initial Decision, 1974), *aff'd*, 1 N.R.C. 347 (1975).

166. *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 6 A.E.C. 995 (1973).

this subject became commonplace.[167] Licensing boards, which had previously been required to deal mainly with narrow, highly technical questions of reactor safety,[168] now were being confronted with extraordinarily broad questions of energy supply policy: For what "end uses" would the electricity from a proposed nuclear power plant be required and could these requirements be met at lower costs by a variety of energy conservation measures and alternative energy sources?[169]

The results were predictable. While hearings grew lengthier and more costly, they also became charades. Every construction permit proceeding held by the AEC culminated in the conclusion that there was indeed a "need for power" on the applicant's system and that the proposed nuclear facility was the "optimal" response to that need.[170] While the AEC gave lip service to its obligation to consider the full array of possible alternatives to the 1,000 Mw nuclear power plant typically proposed, in reality it never examined seriously the merits of any alternative policy option except that of the equally large coal-fired facility.[171] This default should have been obvious, but was hardly noticed because of the way the AEC structured its "need for power" inquiry, which it approached in two stages.

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167. *See, e.g., In re* Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), 7 A.E.C. 659 (Partial Initial Decision of ASLB, Apr. 9, 1974), *aff'd*, 4 N.R.C. 397 (1976); *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046 (Initial Decision of ASLB, June 14, 1974), *aff'd*, 1 N.R.C. 347 (1975); *In re* Florida Power and Light Co. (St. Lucie Nuclear Power Plant, Unit 2), 8 A.E.C. 117 (Order of ASLB, July 12, 1974); *In re* Pacific Gas and Elec. Co. (Diablo Canyon Nuclear Power Plant, Unit No. 2), 8 A.E.C. 277 (Initial Decision of ASLB, Aug. 2, 1974); *In re* Duquesne Light Co. (Perry Nuclear Power Plant, Units 1 and 2), 8 A.E.C. 644 (Memorandum and Order of ASLB, Oct. 1, 1974).

168. *See generally* S. EBBIN & R. KASPER, CITIZEN GROUPS AND THE NUCLEAR POWER CONTROVERSY: USES OF SCIENTIFIC AND TECHNOLOGICAL INFORMATION (1974); Cramton, *A Comment on Trial-Type Hearings In Nuclear Power Plant Siting*, 58 VA. L. REV. 585 (1972).

169. *See, e.g., In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 7 A.E.C. 1046 (Initial Decision of ASLB, June 14, 1974), *aff'd*, 1 N.R.C. 347 (1975).

170. For a representative sample of these decisions by the Agency's appeal board, see, *In re* Niagara Mohawk Power Corp. (Nine Mile Point Nuclear Station, Unit 2), 1 N.R.C. 347 (1975); *In re* Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), 4 N.R.C. 397 (1976); *In re* Tennessee Valley Auth. (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), 5 N.R.C. 92 (1977); *In re* Public Serv. Co. of New Hampshire, (Seabrook Station, Units 1 and 2) 6 N.R.C. 33 (1977); *In re* Kansas Gas & Elec. Co. (Wolf Creek Generating Station, Unit 1), 7 N.R.C. 320 (1978); *In re* Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), 8 N.R.C. 234 (1978).

171. *See supra* note 170. *See also* McKim, *supra* note 95, at 66-76.

First, the AEC addressed the question of whether the applicant had demonstrated a "need" for additional baseload generating capacity on its system; if so, it would next examine whether a nuclear plant was the least costly way of supplying this capacity.[172] "Need," it will be recalled, was equated with "demand," and thus the question of whether the applicant had demonstrated a "need" for new baseload capacity simply raised the question of whether the applicant's demand forecasts were reasonable.[173] Since these forecasts purported to include an estimate of the extent to which consumers would employ energy conservation measures to reduce their energy requirements, or satisfy them with on-site energy sources, these measures appeared to receive "consideration" during the first stage of the "need for power" inquiry.[174] If this first stage of the inquiry led to the conclusion that the day eventually would arrive when the applicant would require additional capacity, there would be no reason at the second stage of the inquiry to consider conservation measures and on-site sources again, for the AEC could say that they had been "implicitly considered in the . . . demand projections."[175]

Unfortunately, this argument failed to account for the different focuses of the stage one and stage two inquiries. At stage one, in evaluating the applicant's demand forecasts, the question was to what extent energy conservation and on-site sources *would* be employed by the applicant's customers. At stage two, the question warranting discussion was to what extent such measures *should* be implemented as an alternative to the expansion of central station

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172. *See* McKim, *supra* note 95, at 66-70; NUCLEAR REGULATORY COMM'N, PRELIMINARY STATEMENT ON GENERAL POLICY FOR RULEMAKING TO IMPROVE NUCLEAR POWER PLANT LICENSING 14-16, 51-53, 57-60 (1978)..

173. *See supra* text accompanying notes 95-97.

174. *See supra* note 170.

175. Aeschliman v. NRC, 547 F.2d 622, 629 (D.C. Cir. 1976), *rev'd sub nom.* Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519 (1978). *See also In re* Rochester Gas & Elec. Corp. (Sterling Power Project Nuclear Unit No. 1), 6 N.R.C. 350 (Initial Decision of ASLB, Aug. 26, 1977), where the intervenors contended that there was inadequate proof of "need" because the utility had underestimated the effects of energy conservation measures (Contention 1) and, also, that there had not been adequate consideration of energy conservation alternatives to the proposed facility (Contention 10). After concluding that the applicant and the staff had "considered conservation as best they could," *id.* at 377, and that Contention 1 should be rejected, the Commission went on to treat Contention 10 in one sentence: "[W]e have previously described the consideration given to energy conservation in our ruling on Contention 1." *Id.* at 410.

capacity. Under the AEC's approach, this second question was never asked and thus the merits of these nonsupply options, as policy alternatives to capacity expansion, were never considered.[176] While this abdication of NEPA responsibilities was criticized by the District of Columbia Circuit Court of Appeals in *Aeschliman v. NRC*,[177] it was never corrected.[178]

In retrospect, this failure to consider the full range of alternatives to reactor licensing seems to have been inevitable. The AEC was simply not the proper agency to consider this issue; its objectivity was initially compromised by a mandate to promote "the development and utilization of atomic energy,"[179] and while its promotional and regulatory functions were later separated by the Energy Reorganization Act of 1974,[180] this legislative surgery was largely cosmetic. The federal government's long-standing commitment to the commercialization of nuclear power[181] was just too deeply ingrained to be changed by an organizational reshuffle,[182] and an overlay of NEPA responsibilities was insufficient to counteract this inherent promotional bias.

While NEPA required the AEC and NRC to *consider* alternatives to a proposed reactor license, it failed to provide the agency with any authority to *implement* such alternatives.[183] Thus, while the AEC could perhaps have declined to license a proposed nuclear power plant on the ground that some other source of energy—*e.g.*,

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176. *See* IMPROVING REGULATORY EFFECTIVENESS IN FEDERAL/STATE SITING ACTIONS, *supra* note 77, at 5-6 (NRC has been successful in focusing intervenors' energy conservation contentions into the need for power context even though energy conservation contentions can also be logically viewed as raising issues regarding alternatives to the facility itself); McKim, *supra* note 95, at 67-68.

177. Aeschliman v. NRC, 547 F.2d 622, 629 (D.C. Cir. 1976), *rev'd sub nom.* Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519 (1978).

178. *See In re* Rochester Gas & Elec. Corp. (Sterling Power Project Nuclear Unit No. 1), 6 N.R.C. 350 (Initial Decision of ASLB, Aug. 26, 1977). For a discussion of this case, see *supra* note 175.

179. 42 U.S.C. § 2013(d) (1976).

180. *Id.* § 5801.

181. *See generally* I. BUPP & J. DERAIN, LIGHT WATER: HOW THE NUCLEAR DREAM DISSOLVED (1978).

182. *See, e.g.*, REPORT OF THE PRESIDENT'S COMM'N ON THE ACCIDENT AT THREE MILE ISLAND 19 (1979). ("We have seen evidence that some of the old promotional philosophy still influences the regulatory practices of the NRC").

183. *See, e.g., NRDC v. Morton*, 458 F.2d at 827. The major premise of that decision was, of course, that the Secretary of Interior lacked the power to implement the "alternatives" which the court nevertheless held NEPA required him to consider.

wind generators—was environmentally preferable,[184] it remained unable either to pursue this alternative or to compel its pursuit by the applicant. The denial of a reactor license on environmental grounds might then have proven entirely counterproductive because a utility whose application was rejected was free to build a fossil-fired plant which, arguably, would do even greater harm to the environment. Of course, the AEC might have chosen to deal

184. The existence of even this authority remains debatable since the Supreme Court has steadfastly declined to find any substantive content in NEPA. *See, e.g.*, Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 558 (1978) and Strycker's Bay Neighborhood Council Inc. v. Karlan, 444 U.S. 223, 227 (1979) (per curiam). These, however, were cases in which the Court was presented with claims that NEPA imposed a substantive "obligation" upon federal agencies which required them to develop special procedures for decisions which affected the environment, *Vermont Yankee*, 435 U.S. at 548, or to give special weight to environmental values, *Strycker's Bay*, 444 U.S. at 227-28. The rejection of these contentions does not necessarily mean that these agencies lacked substantive "authority" to protect the environment. In both cases the Court recognized that NEPA established "significant substantive goals for the Nation"; *See Vermont Yankee*, 435 U.S. at 558, and *Strycker's Bay*, 444 U.S. at 227. Because § 102(1) of the Act expressly directs all agencies to interpret and administer the laws of the United States "to the fullest extent possible . . . in accordance with the policies set forth in this Chapter," it seems reasonable to conclude that, at least when an agency exercises its statutory powers, NEPA provides an independent source of authority to protect the environment. The great majority of writers take this view. *See, e.g.*, the authorities collected in Tobias & McLean, *Of Crabbed Interpretations and Frustrated Mandates: The Effect of Environmental Policy Acts on Pre-Existing Agency Authority*, 41 MONT. L. REV. 177, 177-224 (1980). Recent decisions of the courts of appeals support this view as well. For example, in Public Service Co. of New Hampshire v. NRC, 582 F.2d 77 (1st Cir.), *cert. denied*, 439 U.S. 1046 (1978), the NRC conditioned a reactor license on an environmentally acceptable off-site routing of transmission lines running from the facility. The utility challenged the condition, arguing that it was beyond the agency's jurisdiction under the Atomic Energy Act and NEPA. After finding that these transmission lines were properly regarded as components of a "utilization facility" over which the agency had licensing authority under the Atomic Energy Act, *id.* at 82-84, the court concluded that NEPA provided authority for the license condition, *id.* at 85-86, observing as follows: "Once having found that the Commission has jurisdiction over the transmission lines, we think it clear that, under the dictates of NEPA, it was obliged to minimize adverse environmental impact flowing therefrom." *Id.* at 85. *See also* Detroit Edison Co. v. NRC, 630 F.2d 450 (6th Cir. 1980). On the other hand, it has been long recognized that NEPA imposes no duty upon an agency to take actions inconsistent with pre-existing "specific statutory obligations"; *see Calvert Cliffs'*, 449 F.2d at 1125. Since the Supreme Court's decision in *Vermont Yankee* may be read to say that under the Atomic Energy Act control of the choice of power plant generating mode lies with the states, then the denial of a reactor license on the ground that the use of some other energy source would minimize adverse environmental impacts might be seen as in conflict with an existing statutory scheme and hence, unauthorized by NEPA. *See* Natural Resource Defense Council v. Berklund, 609 F.2d 533 (D.C. Cir. 1979) (holding that the Secretary of Interior lacks discretion to deny a coal lease solely on environmental grounds because a statute other than NEPA required him to issue leases to the holders of valid prospection permits).

with this problem by expounding upon the suboptimal nature of the proposed nuclear power plant in its EIS while it nevertheless issued a license, but it is a small wonder that such a self-stultifying option was never exercised. Thus, the absence of the power to implement alternatives sapped all vitality from the obligation to consider them;[185] another example of misplaced faith in the redemptive quality of procedural reform.[186]

This was especially true in connection with "nonsupply" alternatives. While many regulators appreciated a new power plant's twin threats to environmental quality and cheap electric rates, few doubted the existence of a direct correlation between the consumption of energy and economic growth. This so-called "iron-link"[187] between energy and gross national product remained an article of faith which no regulator was about to challenge. A typically reverant expression of this faith can be found in an EIS written by the staff of the AEC:

> This historical correlation between economic activity and consumption of electric power is impressive. . . . Without claiming that the underlying relationship is either well understood or immutable, it is the opinion of the Staff that the strength of the correlation should serve as a warning that a chronic shortage of power in a region may have pronounced economic and social consequences . . . .[188]

It was even less realistic, of course, to expect any regulator to have the temerity to go further and suggest that economic growth itself be curtailed. Unfortunately, energy conservation proposals were too easily misperceived as "no-growth" measures rather than "efficient-growth" options—this may explain the AEC's acquies-

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185. *Cf.* Kentucky v. Alexander, 655 F.2d 714, (6th Cir. 1981) (in deciding to issue permit to developer for construction of port and industrial complex, Army Corps of Engineers need not consider "alternative" of site not proposed by developer).

186. *See* Sax, *The (Unhappy) Truth About NEPA*, 26 OKLA. L. REV. 239 (1973). The lesson had been learned before, *see* Kaufman, *Power For the People — And by the People: Utilities, the Environment and the Public Interest*, 46 N.Y.U. L. REV. 867 (1971) (concluding that FPC licensing proceedings had too narrow a perspective to bring the full range of project alternatives into view). *See also* Hill & Ortolano, *NEPA's Effect on the Consideration of Alternatives: A Crucial Test*, 18 NAT. RES. J. 285 (1978) (an empirical study of the Corps of Engineers and Soil Conservation Service concluding that agency personnel merely give lip service to their "obligation" to consider alternatives).

187. The term is coined in ENERGY FUTURE, *supra* note 3, at 141-42.

188. FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION OF NINE MILE POINT NUCLEAR STATION, UNIT 2, *supra* note 151, at 10-3.

cent equation of "need" with "demand."[189] Additionally, there was simply no provision in NEPA which suggested that Congress had intended the AEC, or any federal agency for that matter, to make a determination of the level of energy consumption at which the quality of life was supposedly maximized. Thus, "need for power" and "energy conservation alternatives" to capacity expansions were not going to receive serious consideration in AEC licensing proceedings, whatever place they deserved in a theoretically ideal search for "the most intelligent, optimally beneficial decision."[190]

After the Supreme Court's decision in *Vermont Yankee*,[191] it seems fair to question whether these issues ever deserved to be considered at all in these proceedings. The case arose out of a licensing proceeding[192] in which the AEC had declined to consider intervenor advanced "energy conservation alternatives" which failed to pass what the AEC called a "threshold test" of reasonableness.[193] Drawing upon familiar doctrine which taught that the Commission had an affirmative obligation to consider alternatives, the District of Columbia Circuit Court of Appeals reversed, concluding that the threshold test had impermissibly shifted this obligation to the intervenors by requiring them "to prove an alternative satisfies 'the rule of reason' before the Commission will investigate it."[194]

The Supreme Court took a different view of the matter, perhaps disagreeing less with the lower court's rationale than with its application to "this case."[195] Portions of the Court's opinion swept rather broadly, however,[196] and at least one passage seemed to sug-

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189. *See supra* text accompanying notes 95-102 & 172-78.

190. *Calvert Cliffs'*, 449 F.2d at 1114. Few, perhaps, were really surprised by the failure to achieve NEPA's ideal. *See, e.g.*, Cramton & Berg, *On Leading A Horse to Water: NEPA and the Federal Bureaucracy*, 71 MICH. L. REV. 511, 533 (1973).

191. Aeschliman v. NRC, 547 F.2d 622 (D.C. Cir. 1976), *rev'd sub nom.* Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 549-58 (1978).

192. *In re* Consumers Power Co. (Midland Plant, Units 1 and 2), 7 A.E.C. 19 (1974).

193. *Id.* at 24. This "test" had three elements. To obtain Commission consideration of an "energy conservation alternative," intervenors had to show: First, that it would "curtail demand for electricity to a level at which the proposed facility would not be needed"; second, that it was "reasonably available"; and third, that its efficacy was susceptible to a reasonable degree of proof. *Id.*

194. *Aeschliman*, 547 F.2d at 628.

195. *Vermont Yankee*, 435 U.S. at 550.

196. *See generally* Rodgers, *A Hard Look at Vermont Yankee: Environmental Law Under Close Scrutiny*, 67 GEO. L.J. 699 (1979).

gest that the AEC had little if any business considering energy conservation at all:

> There is little doubt that under the Atomic Energy Act of 1954, state public utility commissions or similar bodies are empowered to make the initial decision regarding the need for power. 42 U.S.C. § 2021(k). The Commission's prime area of concern in the licensing context, on the other hand, is public health and safety, 42 U.S.C. §§ 2132, 2133, 2201. And it is clear that the need, as that term is conventionally used, for the power was thoroughly explored in the hearings. Even the Federal Power Commission, which regulates sales in interstate commerce, agreed with Consumers Power's analysis of projected need.
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> NEPA, of course has altered slightly the statutory balance, requiring "a detailed statement by the responsible official on . . . alternatives to the proposed action." 42 U.S.C. § 4332(c).[197]

The implications of this language are less than clear. One writer has asserted that it "announces no change in the accepted obligation to address real and workable alternatives" including the "no-action" alternative,[198] but this seems to ignore the implication that the Commission's responsibility to consider energy conservation alternatives was clearly diminished because an "initial decision regarding the need for power" was to be made by "state public utility commissions or similar bodies."[199] On the other hand, it would seem wrong to interpret this language to mean that the Commission was relieved *entirely* of its NEPA obligation to consider energy conservation alternatives to a proposed power plant. After all, the Court refers to "public health and safety" as the Commission's "prime [*not* its exclusive] area of concern" and, while it is true that the Atomic Energy Act gave the Commission no responsibility to determine "need for power," the Court does acknowledge that "NEPA, of course has altered slightly the statutory balance by requiring a detailed statement of alternatives."[200]

In addition, the Court had subscribed unanimously to the view that NEPA responsibilities could be relieved only by a "clear and unavoidable conflict of statutory duty" only two terms before,[201]

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197. *Vermont Yankee*, 435 U.S. at 550-51.

198. Rodgers, *supra* note 196, at 726.

199. *See* Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm'n, 103 S. Ct. 1713, 1717 (1983) ("Need for new power facilities" is an area "characteristically governed by the states").

200. *Vermont Yankee*, 435 U.S. at 550-51.

201. *Id. See* Flint Ridge Development Co. v. Scenic Rivers Ass'n, 426 U.S. 776, 778 (1976).

and there seems no reason to suppose that it would retreat so soon. Certainly, no such "conflict" was present. Section 274(k) of the Atomic Energy Act[202] is the only statutory provision which the Court cited in connection with its observation that "under the Atomic Energy Act of 1954, state public utility commissions or similar bodies are to make the initial decision regarding the need for power."[203] That section, however, has been termed a "garden-variety nonpreemption clause"[204]—that is, one which "merely ensures that the authority of . . . [the states] will continue, unimpaired by the provisions of the Atomic Energy Act . . . [not] that the regulatory field is completely closed to the Commission."[205]

If, as a fair reading of *Vermont Yankee* suggests, the Commission's role in making the need for power determination falls somewhere between the extremes of "no authority" and "plenary authority," the question remains: Just where does it fall? What does it mean to say, as the Court does, that "NEPA has *altered slightly*

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202. 42 U.S.C. § 2021(k) (1971).

203. *Vermont Yankee*, 435 U.S. at 550.

204. Public Serv. Co. of New Hampshire v. NRC, 582 F.2d 77, 85 (1st Cir.), *cert. denied*, 439 U.S. 1046 (1978). *See also* South Dakota Pub. Util. Comm'n v. FERC, 690 F.2d 674 (8th Cir. 1982) (holding that the states retain authority to regulate both the timing and fuel type of new power plant construction).

205. Detroit Edison Co. v. NRC, 630 F.2d 450, 453 (6th Cir. 1980). It is curious that the court cited § 274(k), 42 U.S.C. § 2021(k), rather than § 271, 42 U.S.C. § 2018, since the latter section seems more easily read to reserve the "need for power" determination to the states. Section 274 authorizes the Commission to enter into agreements with the states, allowing them to regulate certain uses of nuclear materials, and subsection (k) provides: "Nothing *in this section* shall be construed to affect the authority of any state or local agency to regulate activities for purposes other than protection against radiation hazards" (emphasis added). Section 271 declares that: "Nothing *in this Act* shall be construed to affect the authority or regulations of any Federal, State, or local agency with respect to the generation, sale, or transmission of electric power produced through the use of nuclear facilities licensed by the Commission . . . ." (emphasis added).

On other occasions the Supreme Court has chosen to read language like the "*in this section*" language of § 271 more literally than it did in *Vermont Yankee*. *See* City of Milwaukee v. Illinois, 451 U.S. 304 (1981) (construing § 505(e) of the 1972 amendments to the Federal Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 888 (codified at 33 U.S.C. § 1365(e) (1976)). In any event, the lower courts which have addressed problems involving the federal-state allocation of authority to regulate activities implicating the licensing of nuclear power plants generally have examined both sections and concluded that neither was intended as a limitation on federal authority. *See, e.g.*, Detroit Edison Co. v. NRC, 630 F.2d 450 (6th Cir. 1980); Public Serv. Co. of New Hampshire v. NRC, 582 F.2d 77 (1st Cir. 1978), *cert. denied*, 439 U.S. 1046 (1978).

the statutory balance"?[206] By themselves the words are cryptic, but the Commission quickly construed them as an invitation to relieve itself of major responsibility for "need" determinations in its licensing proceedings; henceforth the appeal board ruled, it would accept the "need" determinations made by "local regulatory bodies" unless they were shown to "rest upon a flatly flawed foundation."[207] The AEC was thus finally able to free itself of the obligation to think about the "unthinkable"[208] and, despite the lament of NEPA purists who maintain "there is no more important aspect of NEPA than the obligation to discuss" the no-action alternative,[209] the loss to effective regulation of nuclear capacity expansion will be nil. The Commission's "need" determinations have always been shams; an outgrowth of the federal government's overall lack of responsibility for managing bulk power supply.

This lack of federal managerial responsibility often has been a target for criticism. Numerous studies have found fault with state supervision of bulk power systems, either because of operational economies of scale amenable to capture only by regulation on a broader geographic basis, or because the individual states are discouraged by the fear of competitive disadvantages from regulatory initiatives which might result in higher electricity prices.[210] Recommendations for "regional" regulation or regulation by a federal agency on a "regional" basis, however, have generated precious little legislative enthusiasm[211] and, with the exception of the Pacific

206. 435 U.S. at 551.

207. *In re* Carolina Power & Light Co. (Shearon Harris Nuclear Plant, Units 1, 2, 3 and 4), 8 N.R.C. 234 (1978); *In re* Rochester Gas & Elec. Corp. (Sterling Power Project Nuclear Unit No. 1), 8 N.R.C. 383 (1978). More recently, the NRC has provided, by rule, that it will no longer consider "need for power" and alternative energy source issues in operating license proceedings. *See* Need For Power and Alternative Energy Issues in Operating License Proceedings, 47 Fed. Reg. 12940 (1982).

208. *In re* Vermont Yankee Nuclear Power Corp. (Vermont Yankee Power Station), 7 A.E.C. 159, 173 (1974) ("The alternative of not meeting real demand is unthinkable").

209. *See* Rodgers, *supra* note 196, at 726.

210. *See, e.g.*, THE NATIONAL POWER GRID STUDY, *supra* note 6; A TIME TO CHOOSE, *supra* note 12, at 265-66 (1974); ELECTRICITY AND THE ENVIRONMENT, *supra* note 3, at 268-70, 283-84; FEDERAL POWER COMM'N, REPORT ON THE NORTHEAST POWER FAILURE 6 (1965) ("the enormous development of interstate power networks in the last thirty years requires a reevaluation of the governmental responsibility for continuity of the service supplied by them, since it is impossible for a single state effectively to regulate the service from an interstate pool or grid").

211. *See generally* Lagansa, *State Utility Commissions as Vestigal Organs: The Need For Regional Governance of Electric Utilities*, 28 U. KAN. L. REV. 291 (1980). It was not

Northwest, there seems little likelihood of any such capability being developed in the near future.[212] Unfortunately, the "second best" approach, federal or state management of bulk power supply, is by no means clear.[213] For this reason alone, further experimentation in what Brandeis termed the "state laboratories"[214] seems preferable to federal preemption, especially in light of the fact that the costs of both conventional generation and nonsupply alternative energy sources are not characterized by national uniformity. In addition, the history of our inability to fashion a national energy policy[215] suggests that the federal control over bulk power regulation would more likely produce paralysis than progress.

Thus, while the quality of the "need for power" determinations made by a federal agency (such as the NRC or the FERC) could be improved by granting the agency authority to implement alternatives to utility-sponsored capacity expansion, such a major reallocation of regulatory responsibility still seems unwise. Nevertheless, there appears little reason to perpetuate the practice of sham determinations of "need" by federal licensing agencies; if, as seems best, the states are to retain the authority to manage bulk power systems, then the authority to determine when there is a "need" for new capacity ought to be theirs as well.

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until after the 1965 Northeast power failure that Congress first gave the FPC authority to compel utility coordination and interconnection. Even then, the FPC could act only temporarily in the event of an emergency or upon the complaint of a utility or state PUC. *See* Federal Power Act of 1965, § 202, 49 Stat. 848 (codified as amended at 16 U.S.C. §-824a(c) (1976)). The Commission (now known as FERC) just recently has been given the power to act on its own motion. *See* Public Utility Regulatory Policies Act § 202, 16 U.S.C. § 824i (1978).

212. In December, 1980, Congress passed The Pacific Northwest Electric Power Planning and Conservation Act, Pub. L. No. 96-501, 94 Stat. 2697 (1980), making regional energy supply management a reality in the Pacific Northwest. Regionalization could succeed in this area because of a unique combination of circumstances. A growing fear of capacity shortages had placed a premium on the efficient management of power resources. In addition, regional management was not wholly revolutionary; a large share of the area's capacity always has been composed of federal hydroelectric projects whose generation has been marketed by the Bonneville Power Administration, the entity which continues to provide the administrative framework for comprehensive energy supply management under the new Act.

213. *See generally* LANDSBERG, ENERGY: THE NEXT TWENTY YEARS 521-25 (1979). *See also* Lagansa, *supra* note 211 (recommending state level regulation on a cooperative basis); ELECTRICITY AND THE ENVIRONMENT, *supra* note 6, at 268-71, 283-84 (recommending regulation by a federal agency).

214. New State Ice Co. v. Leibmann, 285 U.S. 262, 311 (1931) (Brandeis, J., dissenting).

215. *See* Goldsmith & Banks, *Book Reviews*, 10 CAL. W. INT'L L. J. 157, 157-58 (1980).

2. *State regulation.* It is plainly evident that much needs to be done to improve the quality of state regulation of utility capacity expansion.[216] First, however, the reasons for the ineffectiveness of state regulation need to be better understood. The widely held belief is that state regulation failed because the states lacked expertise in the techniques of forecasting,[217] but this view appears to rest upon a misapprehension of the role forecasts have really played in the decision process. As has been shown, "need" is determined by a process which conciliates competing forecasts, not one which analyzes them.[218] The notion that state regulation would have been better if only the states had developed sooner a sophisticated forecasting capability thus seems to make too much of a failing which, at worst, contributed only marginally to a more deeply rooted institutional problem. In fact, state regulation was doomed from the start because it was undertaken in the context of either facility certification or ratemaking proceedings; neither setting provided a viable framework for the effective supervision of capacity expansion.

Facility certification proceedings (whether held by a siting agency or a PUC) have suffered from the same design defect as that which crippled the AEC; they could culminate only in approval or disapproval of a utility-proposed capacity addition.[219] An

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216. *See generally* ELECTRICITY PLANNING, *supra* note 77, 14-38; IMPROVING REGULATORY EFFECTIVENESS IN FEDERAL/STATE SITING ACTIONS, *supra* note 77, at 6-8.

217. IMPROVING REGULATORY EFFECTIVENESS IN FEDERAL/STATE SITING ACTIONS, *supra* note 77, at 6-8.

218. *See supra* text accompanying notes 106-22.

219. In New York, a rather feeble effort was made to deal with this problem by requiring all applications for power plant certification to include not only the environmental data needed to license the proposed facility, but a complete set of such data for a facility at a different site. *See* N.Y. ADMIN. CODE tit. 16, § 70.20 (1972). The theory behind this "two complete case" requirement was, of course, that a siting board could not realistically be expected to evaluate a utility proposal unless, at the same time, it had the opportunity to consider "fall back" alternatives, i.e., those that could and would be implemented. *See* N.Y. PUB. SERV. COMM'N, STAFF REPORT ON ARTICLE VIII OF THE PUBLIC SERVICE LAW 12 (1977) (document on file with the NYPSC). To a certain extent, the requirement has worked. *See, e.g., In re* Long Island Lighting Co. (Jamesport Nuclear Power Station), N.Y. Bd. on Elec. GS-E Case No. 80003 (Sept. 8, 1980) (certifying one coal-fired unit instead of two proposed nuclear plants); *In re* New York State Elec. & Gas Co. (Somerset Electric Generating Station), N.Y. Bd. on Elec. GS-E, No. 80002 (Dec. 29, 1978) (certifying coal-fired plant at "alternative" site rather than "primary" site). On the other hand, since the utility-proposed alternative to a large nuclear unit was always an equally large coal station (or vice versa), the "two complete case" requirement never operated to prompt siting board consideration of decentralized "alternatives" to capacity expansion. The utilities have found the require-

agency which concluded, for example, that some alternative combination of conservation measures and decentralized energy sources was more in the public interest than an increment of conventional generating capacity, would have been unable to assure implementation of its preferred alternative. Disapproval of a utility proposed power plant thus would have carried with it the risk that a real need for energy might go unmet, a risk that state regulators found no easier to face than did their federal counterparts.[220] Unfortunately, this notion that central station capacity deficiencies were unthinkable tended to guarantee regulatory approval of utility proposed expansion. Given the great uncertainty inherent in long-range forecasts, an examination of the comparative costs of underbuilding versus overbuilding should have played a pivotal role in every facility certification proceeding. Incredibly, it seems never to have been squarely faced.[221]

Ratemaking proceedings also failed to provide a suitable setting for the control of capacity expansion. Traditionally, these proceedings have looked backwards; that is, rates for the future have been fixed on the basis of a company's experience during a historical "test year."[222] Rateregulators thus had no opportunity to preview proposed investments. They were, of course, empowered to

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ment onerous; *see* Cronin & Turner, *Article VIII of the Public Service Law — The Brave New World of Power Plant Siting In New York: A Critique and Suggestion For An Alternative Approach*, 42 ALB. L. REV. 537, 545-56 (1978).

220. *See, e.g., In re* Arkansas Power & Light Co., Ark. PSC Opinion No. U-2903 (Aug. 31, 1978), where the Arkansas Pubic Service Commission approved the construction of a 1400 Mw coal-fired generating station notwithstanding its "belief that the soft path is the preferred path and that in most instances both utilities and consumers will benefit from substituting energy conservation for construction of new generating capacity." *Id.* at 8. *See also In re* Long Island Lighting Co., N.Y. Bd. on Elec. GS-E Case No. 80003, at 13 (coal plant certified despite a State Energy Master Plan which called for the development of low-head hydroelectric capacity because "we cannot now *assure* that specific amounts of new hydro capacity will be available as a substitute for future base load generation").

221. The issue has been glossed over in a number of nuclear licensing proceedings. *See, e.g.*, the discussion of the *Seabrook* decision, *supra* notes 131-39 and accompanying text; *see also In re* Niagara Mohawk Power Corp., 7 A.E.C. 1046, 1047 (1974) (completion of Nine Mile Point Nuclear Station, Unit 2, one year early would produce an economic benefit but that completion several years early would 'probably' result in economic loss"); *In re* Rochester Gas & Elec. Corp., 6 N.R.C. 350, 407-08 (1977) (concluding that "some economic benefit" would result from early completion of Sterling Power Project Nuclear Unit No. 1). *Cf.* Ford & Yabroff, *Defending Against Uncertainty in the Electric Utility Industry*, 4 ENERGY SYS. & POL'Y 57 (1980) (arguing that underexpansion is less costly than overexpansion).

222. *See, e.g.*, BREYER, REGULATION AND ITS REFORM 50 (1982); A. KAHN, *supra* note 9, at 26.

disallow past investments found to have been imprudent, but as we have seen, such after-the-fact review came too late to be effective.[223]

It is becoming more common today for ratemaking proceedings to be forward-looking, with rates fixed on the basis of predicted experience during a future test year.[224] While this will provide rateregulators with an occasional opportunity to appraise the prudence of a proposed investment in capacity expansion before it is made, most investment in new capacity will still be made in advance of regulatory review. Since all such expenditures are initially capitalized, they have no impact upon rates until they are included in a company's rate base. As has already been noted, this ordinarily will not occur before the facility goes into service unless the company is in serious financial difficulty and seeks earlier rate recognition of its investment, *e.g.*, by seeking rate base inclusion for CWIP.[225] By then, of course, the company's financial commitment to expansion is substantial and regulatory review once again has occurred after-the-fact.[226]

In addition to their other drawbacks, both certification and ratemaking proceedings, with their focus on a single facility or a single company, provide too narrow a perspective for the regulation of capacity expansion. Years ago, a new generating unit would be built by a single utility company to meet its own capacity requirements. Today, however, new units are commonly owned by several companies who integrate their operations through cooperative arrangements known as power pools.[227] While this has enabled companies to achieve large economies of scale in the cost of owning new plants, by reducing the amount of excess capacity which would otherwise be created on a single company's system when a new unit is brought into service, it has also broadened the scope of

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223. *See supra* text accompanying notes 63-74.

224. *See, e.g.*, N.Y. PUB. SERV. COMM'N, STATEMENT OF POLICY ON TEST PERIODS IN MAJOR RATE PROCEEDINGS (Nov. 23, 1977).

225. *See supra* note 61 and accompanying text.

226. *See In re* Commonwealth Edison Co., NUCLEAR REG. REP. (CCH) ¶ 20,168 (Ill. Commerce Comm'n, Oct. 15, 1980) ("Once substantial expenditures have been made in the construction of generating plants, little flexibility, if any, exists to change the scheduled completion of such plants without incurring substantial penalties").

227. *See, e.g., In re* Niagara Mohawk Power Corp., NYPSC Opinion No. 77-23, at 8-9 (Dec. 5, 1977) (approving cotenancy agreement by which ownership of 1,100 Mw nuclear power plant was shared among five utilities).

the "need for power" issue. Whereas "need" previously could be determined by examining the reserve margin requirements and production costs of a single utility, the appropriate reliability and economic considerations implicated by the proposal of a new power plant are now those of a multi-company power pool. Trying to explore these system-wide considerations in either a ratemaking proceeding (which focuses on a single company) or a certification proceeding (which focuses on a single facility) will thus raise two serious risks; either system-wide questions will not be addressed as they should be,[228] or the same system-wide questions will be examined repeatedly in individual proceedings.[229]

Generic or "state-wide" proceedings offer a less obvious advantage as well. Having to make the "need for power" determination on a generic basis should encourage the regulators to address the broad policy questions which it presents. Properly considered, the "need" determination involves more than long-range forecasts of load and capacity requirements and comparative generating economics. Since the marketplace cannot work as an efficient allocator of capacity resources,[230] it is entirely appropriate for government to promote those patterns of energy use which are efficient. Thus, in making the "need" determination, government regulators ought

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228. *See In re* Rochester Gas & Elec. Corp., NYPSC Opinion No. 27855 (Moynihan, A.L.J. Aug. 13, 1981) (company argued that the needs of the New York Power Pool justified its retention of a site for future generation, but the administrative law judge determined that the prudence of the company's investment should be made by looking only at the company's needs).

229. For an example of the wasteful duplication of effort invited by examining the "need" question in four individual facility certification proceedings, *see In re* New York State Gas & Elec. Co., N.Y. Bd. on Elec. GS-E Case No. 80002 (Dec. 29, 1978); *In re* Long Island Lighting Co., N.Y. Bd. on Elec. GS-E Case No. 80003 (Sept. 8, 1980); *In re* Rochester Gas & Elec. Co., N.Y. Bd. on Elec. GS-E Case No. 80005 (Feb. 11, 1980); *In re* Niagara Mohawk Power Corp., N.Y. Bd. on Elec. GS-E Case No. 80007 (Dec. 29, 1978). Four different facilities were proposed by companies in the seven member New York Power Pool, two by individual companies, one by two companies, and one by four companies. The installation dates planned for the four facilities were 1983-1984, 1988-1990, and 1990-1992. In each proceeding the siting board was thus required to review the entire Pool's load and capacity forecasts for overlapping periods.

Prior to the accident at Three Mile Island, the NRC began steps—which it never completed—to eliminate case-by-case consideration of generic "need" issues in its reactor licensing proceedings. *See* NRC Interim Policy Statement: Generic Rulemaking to Improve Nuclear Power Plant Licensing, 43 Fed. Reg. 58377 (Dec. 14, 1978); NUCLEAR REGULATORY COMM'N, PRELIMINARY STATEMENT ON GENERAL POLICY FOR RULEMAKING TO IMPROVE NUCLEAR POWER PLANT LICENSING, NUREG-0499 (1978).

230. *See supra* text accompanying note 102.

to decide not only how much central station capacity will be demanded, but also how much of our energy requirements, as a matter of policy, should be provided by conventional generation and how much by alternative energy sources. Case-by-case decision making, under the influence of trial-type procedures, has perpetuated an atomistic perspective which has done more to obscure this policy content of the "need for power" determination than to illuminate it.

A few states have moved away from the traditional case-by-case approach and have begun to consider the "need for power" question in connection with the preparation of comprehensive state plans for overall energy supply.[231] These state-wide proceedings offer an improved setting for the supervision of capacity planning for several reasons; they are timely, they invite bulk power expansion to be examined as just one of several available alternative energy sources and, most importantly, they shift the initiative in energy supply planning from utility management to public officials. Unfortunately, the potential benefits from this shift are not likely to be fully realized because these newly created planning agencies, like their more reactive predecessors, have no power to implement their plans.[232] In New York, for example, while a state energy master plan is now prepared every two years by the Energy Planning Board, the proposal of a new generating station remains the prerogative of utility management, the certification of the proposed station remains the responsibility of a siting board (the Board on Electric Generation Siting and the Environment), and rate recognition of the investment in the station remains the responsibility of the Public Service Commission.[233]

This diffusion of authority promises to retard real improve-

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231. *See generally* THE NEED FOR POWER AND THE CHOICE OF TECHNOLOGIES: STATE DECISIONS ON ELECTRIC POWER FACILITIES, *supra* note 65, at 5. California, New York and Wisconsin led the way. SEE CAL. PUB. RES. CODE § 25000 (West 1977), added by 1974 Cal. Stat. 501; N.Y. ENERGY LAW § 5-112 (McKinney 1968), added by 1978 N.Y. Laws c. 707; Wisc. Stat. Ann. § 196.491 (West 1983), added by 1975 Wisc. Laws c. 68.

232. *See, e.g., Advance Plans for Construction of Facilities*, 05-EP-1 (Wisc. PSC, Aug. 11, 1978). In connection with its review of the state's utilities' long-range expansion plan, the PSC made a 90% reduction in the companies' demand projections to allow for the estimated effects of conservation, but declined to impose limits on capacity additions in favor of alternative sources because of its duty "to *insure* a reasonably adequate supply of electric power." *Id.* at 6 (emphasis supplied).

233. *See* N.Y. ENERGY LAW § 5-112 (McKinney 1968); N.Y. PUB. SERV. LAW §§ 64, 142 (McKinney 1983).

ment in the control of capacity expansion. Where provisions in some state plans for increased reliance upon alternative energy sources are not self-fulfilling, it is disingenuous to expect that their mere existence will prompt siting boards to reject utility proposals for new power plants to meet forecast energy requirements.[234] Perfunctory certification of the need for such proposed expansion is thus likely to continue, and rate regulation will suffer as well. As has been noted, the construction of a new baseload generating unit can be expected to exert enormous upward pressure on a company's rates, and thereby impose a significant revenue obligation on its customers for perhaps three to five decades. Control of such capacity expansion therefore ought to be given to an agency that also has the responsibility and the competence to fix rates.[235] Separation of these functions simply invites the stultification of rate regulation; certification of a proposed plant will later require a PUC to recognize the costs of the plant in a utility's rates,[236] even though the certifying agency's consideration of the revenue implications of its decision may well have been inadequate.[237]

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234. *See, e.g., In re* Long Island Lighting Co. (Jamesport Nuclear Power Station), N.Y. Bd. on Elec. GS-E Case No. 80003, at 13 (Sept. 8, 1980) (licensing an 800 Mw coal plant despite provisions of the State Energy Master Plan proposing development of 1,000 Mw of small-scale hydropower facilities "because these proposals have for the most part not yet advanced beyond the conceptual stage . . .").

235. There would be nothing novel about such an arrangement. Before the recent creation of siting boards and energy planning agencies, PUCs had (but rarely exercised) responsibility for the regulation of capacity expansion, *see supra* text accompanying notes 3-15. Even today this arrangement survives in many states. *See* THE NEED FOR POWER AND THE CHOICE OF TECHNOLOGIES: STATE DECISIONS ON ELECTRIC POWER FACILITIES, *supra* note 75, at 5-18. A similar approach is also taken today in connection with federal supervision of interstate gas pipelines; FERC regulates both capacity and rates in an integrated way. *See, e.g.*, Tennessee Gas Pipeline Co. v. FERC, 689 F.2d 212 (D.C. Cir. 1982) (upholding issuance by FERC of certificate of public convenience and necessity for construction of offshore pipeline and gathering system which conditioned future rate recognition of the facility on achievement of a 60% load factor).

236. *See, e.g., In re* Rochester Gas & Elec. Corp., NYPSC Opinion No. 81-1 at 12 (Jan. 6, 1981) (in rate proceeding to determine whether utility could recover the costs of a cancelled nuclear power project, prior certification by the Siting Board which was issued in 1978 but revoked in 1980 was "conclusive on the issue of need for the facility . . . and is entitled to great weight . . . on the issue of [the utility's] prudence").

237. *See, e.g.*, STATE ENERGY PLANNING PROCEEDINGS, *supra* note 26, at 133-34 (acknowledging that siting boards lack the information needed to assess the financial impact of new generating facilities).

B. *Promoting Better Investments*

The restructuring of our regulatory institutions, while promising some benefits, does not address the root cause of the problem, which remains embedded in the economics of power production; utility profits are closely tied to investment in large scale, capital intensive, bulk power facilities.[238] Thus, it is perhaps not unduly cynical to anticipate that when utility planners gaze into their crystal balls for a view of the fifteen year future, they will continue to see a world where the demand for bulk power grows steadily, where energy conservation measures are not adequate to slow this growth, and where new, decentralized sources of energy are always "promising" but never quite ready to make a significant contribution to the nation's energy supplies.[239] Utilities therefore will continue to see a "need" for additional generating capacity and to press for approval of capacity expansion plans.[240] It is also reasonable to expect that the regulators will continue to find it difficult to reject these plans even when they have doubts about the utility companies' vision of the fifteen year future; these "doubts," accompanied by mere "hopes" for the emergence of alternative energy sources, simply do not provide public officials with sufficient footing on which to take a stand against a multi-billion dollar private

238. *See In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.84902 (Sept. 16, 1975). In that decision, the California PUC wrote:

> At present, the financial incentives for utilities are for increased sales, not conservation. Whatever conservation efforts utilities undertake are the result of good citizenship, rather than profit motivation. We applaud these efforts, but we think the task will be better accomplished if financial and civic motivations were not at cross purposes.

Id. at 162; *Cf.* Rochester Gas & Elec. Co. v. PSC, 71 A.D.2d 185, 422 N.Y.S.2d 770 (1979); Brooklyn Union Gas v. PSC, 71 A.D.2d 171, 422 N.Y.S.2d 490 (1979) (utility challenges to New York legislation requiring them to finance residential conservation).

239. *See, e.g., Elec. Utility Executives Forum*, 107 PUB. UTIL. FORT. 67 (1981); Maher, *supra* note 58 (utility management preoccupation with system "reliability" inherently promotes overexpansion of capacity); ELECTRICITY PLANNING, *supra* note 77, at ch. 4 (utility estimates of minimal near-term contributions to energy supply from decentralized sources are unduly pessimistic); ENERGY USERS REP. (BNA) No. 384, at 18 (Apr. 10, 1980) (utility executives continue to see near-term possibility of "massive electrical blackouts").

240. *See, e.g., One Time Rate Hike of 12.5% Recommended to Bolster Sagging Industry*, 10 ENERGY USERS REP. (BNA) 1079-80 (1982) (poor financial condition of industry has produced temporary lull in new construction but "pent up demand awaiting economic recovery" means that the "next round of decisions on adding generating capacity is . . . three to five years away").

proposal.[241]

A more solid foundation for effective regulation would exist if the utilities themselves were provided the opportunity to invest in decentralized sources of energy, including conservation. Under such circumstances, regulators could do more than simply disapprove of utility proposed bulk power expansion; through creative rate regulation they could also provide the companies with a financial incentive to make more efficient energy supply investments.[242] This power to say "yes" would not only add to the efficacy of saying "no"; it would also reduce the number of occasions where the power to say "no" was necessary. As such, it would re-

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241. A dramatic example is provided by two recent decisions of the New York Public Service Commission. In 1981, the PSC began an investigation of the financial and economic implications of the continued construction of a nuclear power project which had experienced an escalation in direct (exclusive of AFC) construction costs of from $381 million to more than $2.4 billion. The Environmental Defense Fund intervened and presented, as an alternative to completion of the nuclear unit, a substantial investment by the plant's sponsors in end-use conservation, cogeneration and low-head hydropower. The PSC rejected the proposal, concluding that it was an "unsuitable alternative" for completion of the power plant because of unspecified "legal, administrative and practical obstacles." *In re* Financial and Economic Cost Implications of Constructing the Nine Mile Point No. 2 Nuclear Station, NYPSC Opinion No. 82-7, at 16-17 (Apr. 16, 1982). At the same time, the PSC was sufficiently impressed with the EDF proposal to launch a generic investigation of end-use conservation programs. Order Establishing Proceeding, NYPSC Opinion No. 28223 (Boschwitz, A.L.J., Jan. 20, 1983).

Conservation programs similar to the one proposed by EDF are already being implemented in Arkansas, California, Idaho, Michigan, Minnesota, Oregon, Tennessee, Texas and Washington; *see* Financial and Economic Cost Implications of Constructing the Nine Mile Point No. 2 Nuclear Station, NYPSC Opinion No. 82-7, at 15 (Comm'rs Mead & Pooler, dissenting). It is apparent that such programs have a much better chance of regulatory approval if they are *not* offered as an alternative to a specific, utility-sponsored construction project. See, for example, a series of decisions by the California PUC which have spurred the implementation of a substantial end-use conservation program by the state's largest utility; *In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.84902 (Sept. 16, 1975); *In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.89316 (Sept. 6, 1978); *In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.91107 (Dec. 19, 1979); *In re* Pacific Gas & Elec. Co., D.93887 (Dec. 30, 1981).

242. *See generally* Gentry, *Public Utility Participation In Decentralized Power Production*, 5 HARV. ENVT'L L. REV. 297, 336-39 (1981). The California PUC has already taken modest steps in this direction, *see In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.91107, at 180-86 (Dec. 19, 1979) (penalizing the utility $7.2 million, by reducing its rate of return on equity twenty basing points, because of inadequate efforts to promote cogeneration); *In re* Southern Cal. Gas Co., Cal. PUC Opinion D.82-10-021 (Oct. 6, 1982) (providing the company with a $5 million rate reward for success in implementing a conservation program). *See also* CAL. PUB. UTIL. CODE § 454 (West Supp. 1978), added by 1976 Cal. Stat. c. 835 (authorizing the PUC to increase a utility's rate of return by up to 1% for investment in renewable energy sources).

store to utility management much of the responsibility for investment initiatives which, under regulation, has been shifted to public officials.

Other benefits could be expected as well. First, since the lead times of alternative sources would be shorter than those of central station capacity, energy supply plans could be formulated with less uncertainty than that which currently characterizes fifteen to twenty year expansion plans.[243] Second, since utility profits no longer would be linked solely to the expansion of large central station generation, industry forecasts of the future need for such generation would be more credible than is currently the case. Third, and perhaps most importantly, by enabling the vast financial resources of the nation's electric utilities to be invested voluntarily in other than conventional power plants, the arrival on a large scale of alternative energy resources which are economic, safe, environmentally benign, and renewable will be accelerated significantly.[244] This development in turn would facilitate the total deregulation of electric generation.[245]

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243. *See, e.g.*, Boyd & Thompson, *supra* note 49.

244. *See generally* TALBOT & MORGAN, POWER AND LIGHT: POLITICAL STRATEGIES FOR THE SOLAR TRANSITION (1981) (concluding that utility financing may be a necessary step in the solar transition); FELDMAN & WIRTSHAFLER, ON THE ECONOMICS OF SOLAR ENERGY 180-209 (1979). Two factors can be expected to contribute to a speed-up in the market penetration of these new energy sources. First, utility opposition—which has been tenacious—will diminish, *see* Gentry, *supra* note 242, at 315-17; Cross, *Cogeneration: Its Potential and Incentives for Development*, 3 HARV. ENVT'L L. REV. 236, 240-41 (1979) ("Utility antagonism has been a major force frustrating the development of cogeneration"); Lodge, *The Windmill Case: Facing Up to the Appropriate Technology*, 6 ENV. AFF. 491, 498 (1078); Consolidated Edison Co. v. Realty Inv. Ass'n, 524 F. Supp 50, 151 (S.D.N.Y. 1981) (in action brought to enjoin building owner from construction of cogeneration equipment because of alleged violations of Clean Air Act, the court observed that "Con Ed has utilized its considerable muscle in opposing the use of cogeneration"). Second, utility financing will not be slowed by the inertia of consumer investment; *see supra* text accompanying note 102.

245. Congress took a major step toward deregulation of electric generation in enacting the Public Utility Regulatory Policies Act, 16 U.S.C. § 824a-3 (Supp. IV 1980). This provision requires the nation's electric utilities to purchase power from qualifying cogenerators and small power producers at "just and reasonable" rates to be fixed by the states in accordance with standards prescribed by FERC, and authorizes FERC to exempt such qualifying facilities from federal and state public utility regulation. FERC's implementing regulations were issued in 1980, Small Power Production and Cogenerating Facilities—Qualifying Status, 18 C.F.R. §§ 292.101-602 (1982), and were recently upheld by the Supreme Court. *American Paper Inst.*, 103 S. Ct. at 1927. While PURPA excludes utility-owned facilities from its provisions, *see* 16 U.S.C. § 796 17(C)18(B),(C) (Supp. IV 1980) and 18 C.F.R. § 292.206 (1980), the states remain free to permit such ownership. *See, e.g.*, N.Y. PUB. SERV. LAW § 66-c (McKinney Supp. 1982), added by 1980 N.Y. Laws c. 553, § 7 (allowing utilities

The industry will not respond overnight. The institutional prerogatives of growth and centralization are too deeply embedded and the institutional preference for the management of a few large projects rather than thousands of small ones is too deeply ingrained to anticipate sudden change.[246] Nevertheless, enlightened self-interest can be expected to reorder gradually the industry's investment priorities.[247] Of course, utility participation in the development of decentralized energy sources, including conservation, will present new problems which just barely have begun to receive consideration.[248] These include a concern for the maintenance of competition in the energy conservation and small scale energy source markets,[249] the difficulty of assuring the effectiveness of

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to form wholly-owned, unregulated subsidiaries to develop small scale (less than 80 Mw) cogeneration facilities). For more extensive proposals of deregulation, see *supra* note 142.

246. *See* Gilmer & Meunier, *Electric Utilities and Solar Energy: The Service Contract in a New Social Context*, 30 MERCER L. REV. 377, 383-88 (1979); Maher, *supra* note 58.

247. Some utility executives have already perceived that investment in on-site energy sources is, in the long run, in the industry's best interests. *See, e.g.*, ENERGY USERS REP. (BNA) No. 352, at 13 (May 8, 1980), quoting an officer of the American Public Power Association: "If they are to survive, utilities must no longer see their responsibilities ending at the meter. If the consumer's need for heating, for example, can be better served by applying insulation, or by installing solar collectors, then we must be in a position to assist the consumer in providing those previously non-traditional utility services." *See also* Laitos, *Electric Utilities and Residential Solar Development*, in ENERGY AND COMMUNICATIONS IN TRANSITION, *supra* note 88, at 322 ("significant" number of utilities have decided to invest in residential solar energy applications).

248. *See* STATE ENERGY PLANNING PROCEEDINGS, *supra* note 26, at 72-73 (recommending study of potential problems by a task force). *See generally* Finklea & Treiber, *Residential Energy Conservation Measures: A Penny Saved Is a Penny Earned*, 11 ENV. L. 639, 671-78 (1981); FELDMAN & WIRTHSHAFTER *supra*, note 244; Sparrow, *Public Utility Involvement With Distributed Solar Systems*, 1 SOLAR L. REP. 955-70 (1980); Laitos & Feurstein, *May Regulated Utilities Monopolize the Sun?*, 56 DEN. L. J. 31 (1979).

249. *See, e.g.*, Kellman, *De-Utilizing the Energy Industry: Planning the Solar Transition*, 28 UCLA L. REV. 1 (1980); Laitos & Feurstein, *supra* note 248; Laurence & Minan, *The Competitive Aspect of Utility Participation in Solar Development*, 54 IND. L. J. 229 (1979). In 1978, the fear that utility participation in the development of small scale energy resources (including conservation) would have anticompetitive effects led to the enactment § 216 of the National Energy Conservation and Policy Act of 1978, Pub. L. No. 95-619, § 216, 92 Stat. 3217 (codified as amended at 42 U.S.C. § 8217 (Supp. IV 1980)) [NECPA]. NECPA prohibited utility "supply, installation or financing" of "residential conservation measure[s]," a term which was defined to include alternative energy sources utilizing solar energy. *See* NECPA § 210(11), 42 U.S.C. § 8211(11) (Supp. IV 1980). Termed a "major blunder," *see* ENERGY FUTURE, *supra* note 3, at 231, this restriction on utility investment was later substantially relaxed. *See* Solar Energy and Energy Conservation Act of 1980, Pub. L. No. 96-294, § 546, 94 Stat. 719, (codified as amended at 42 U.S.C. § 8217 (Supp. IV 1980)). *See also* Rochester Gas & Elec. Corp. v. PSC, 71 A.D.2d 185, 422 N.Y.S.2d 770 (1979) (striking down PSC rule which prohibited utility residential energy auditors from recommending

conservation measures,[250] and the need to design new rate structures which will apportion equitably the revenue obligations arising from these unconventional investments.[251] While serious, these problems can be dealt with at a cost which seems clearly outweighed by the benefits. At the very least, the potential benefits seem signficant enough to justify experimentation.

CONCLUSION

This Article has examined the causes and serious consequences of the electric utility industry's persistent tendency to overestimate the future need for new generating stations. It also has been shown that this tendency cannot be counteracted effectively by regulation which presupposes an ability to expose the industry's forecasting errors. Currently proposed regulatory reforms, which are designed simply to enable the utilities to finance their construction plans, are thus fundamentally flawed. It is evident, moreover, that these plans will not be abandoned by the utilities until it is in their financial interests to do so. Accordingly, this Article has suggested that the nation's utilites be provided the opportunity and incentive to develop alternative energy sources. In the long run, an approach which promotes "good" investment decisions by the industry is vastly preferable to one which relies upon the prevention of "bad" ones by the government.

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conversions from oil to electric or gas heating); CAL. PUB. UTIL. CODE § 2775.5(b) (West Supp. 1983) (requiring PUC to consider effect on competition before it approves utility application to market solar energy systems).

250. *See, e.g., In re* Pacific Gas & Elec. Co., Cal. PUC Opinion D.89316, at 48-61 (Sept. 6, 1978). Here, the California Energy Commission contended in its brief to the PUC that "[i]t is impossible to determine at this time . . . whether or not PG & E's claimed savings are true and . . . whether or not such savings indicate an effective conservation program. For example, factors other than conservation may slow demand in an area, and conversely, there may be significant conservation even with increased demand." *Id.* at 55.

251. *See, e.g.*, Bryson and Elliott, *California's Best Energy Supply Investment: Interest Free Loans For Conservation*, 108 PUB. UTIL. FORT. 19 (1981); Lazare, *A Case Study in Utility Financing for Residential Conservation Measures*, 107 PUB. UTIL. FORT. 28 (1981); Jones, *The National Energy Act and State Commission Regulation*, 30 CASE W. RES. 324, 339 (1980) (discussing whether a "user charge" or "collective benefit" concept should guide the allocation of revenue obligations associated with conservation investments).